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THE AMERICAN NEPTUNE

A QUARTERLY JOURNAL OF MARITIME HISTORY

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Editor's Note

After years of planning and preparation, the Peabody & Essex Museum will soon host one of the most important exhibits of maritime art ever to visit the United States. It is *The Great Age of Sail*, an exhibit drawn from the collection of the National Maritime Museum of Greenwich, England. Here is how the Peabody & Essex's Curator of Maritime History Daniel Finamore, who also serves as News Editor for the *Neptune*, describes the era and the exhibit which documents it:

"The Great Age of Sail: the dawn of knowledge about the world's distant lands, cultures, commodities; a time of fiery sea battles fought between navies of insular monarchies for moral and economic superiority; an era of daring merchant captains exploring uncharted waters seeking exotic trade goods and incalculable wealth; a romantic time when fortunes and lives were made and lost by those who risked all traveling to establish and expand empires. The era extends from the most speculative exploratory ventures of the sixteenth century through the regularly scheduled barque, clipper, and schooner traffic that powered nineteenth-century trans-global commerce — a Homeric subject indeed.

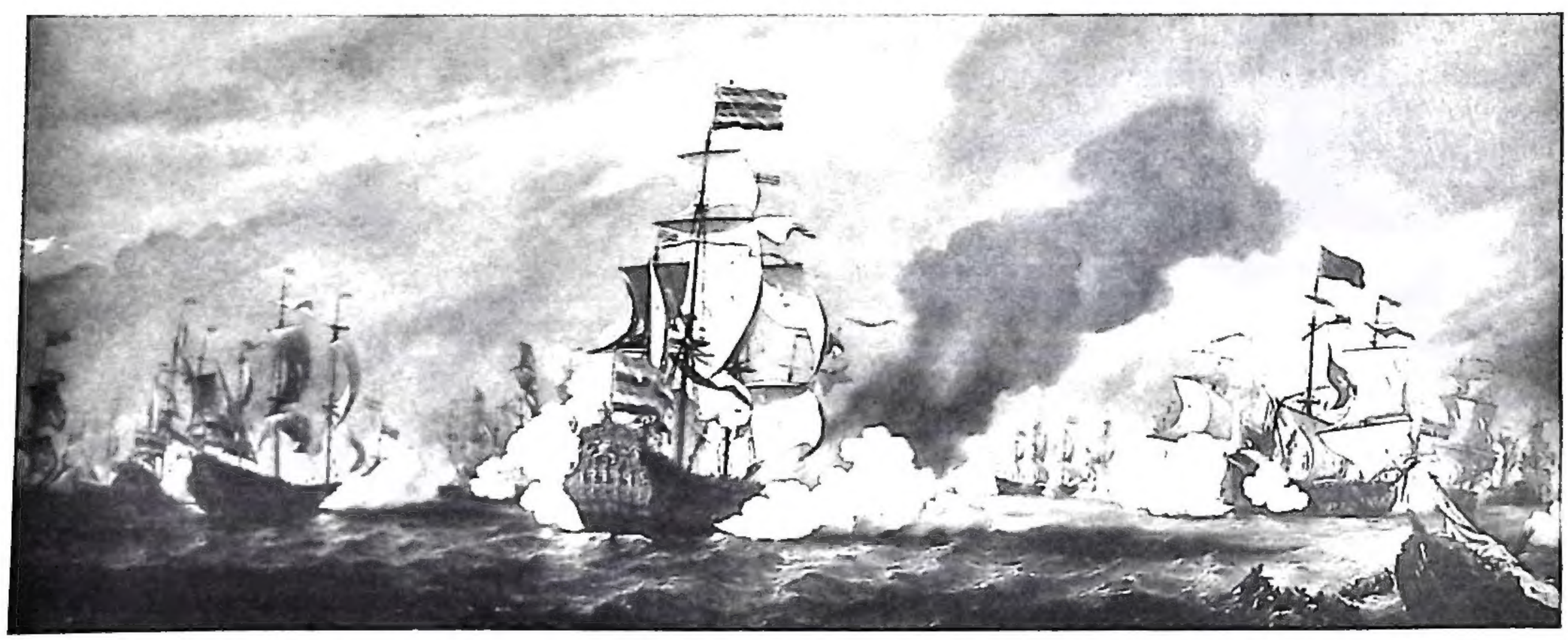
"At eighty paintings, many of truly immense proportions, and twenty artifacts including painted globes, swords, models, and navigational instruments, *The Great Age of Sail* is the largest museum exhibit ever to open in Salem. Featured in the exhibit are the works of J. M. W. Turner, William Hogarth, Sir Joshua Reynolds, the van de Veldes, Ludolf Bakhuisen, and many more; also included are artifacts like the chronometer taken by Fletcher Christian from Captain Bligh on his fateful voyage and a dial owned by Sir Francis Drake. The exhibition is organized thematically, with sections on exploration, war at sea, encounters with the elements, shipbuilding and navigation, trade and empire, sport, and ceremony. Yachtsman Walter Cronkite narrates a guided audio tour through the exhibit.

"*The Great Age of Sail* is a monument of marine art and artifacts, presenting a pictorial narrative of Britain's centuries-long dominion of the seas. The museum is planning a wide range of public and educational programming to support the exhibit, providing visitors with new insights into themes that the works on display present. Highlighted among the events is a Thursday night lecture series featuring William McNeill of the University of Chicago on 'The Historical Background to the Great Age of Sail' (11 March); Brian Lavery of the National Maritime Museum on 'Life in Nelson's Navy' (1 April); and Marcus Rediker of Georgetown University on 'Changing Course: Toward a People's History of the Sea' (6 May)."

The Peabody & Essex is the last of three U.S. museums to host this major exhibit, which runs from 28 February to 2 June. For more information on subscriptions to the lecture series, call the museum at (508) 745-1876.

TIMOTHY J. RUNYAN

Cleveland, Ohio



Cornelis Tromp's flagship, *Gouden Leeuw*, in the last great engagement of the Anglo-Dutch Wars, the Battle of the Texel, 11 August 1673, by Willem van de Velde the Younger, 1687. Photo courtesy of the Peabody & Essex Museum, Salem, MA.

New Technology in the Old Navy: The United States Navy during the 1870s

FREDERICK S. HARROD

During the 1870s, the United States Navy made significant progress in studying and developing new ideas and new technology — advances that provided a foundation for the transformation of the fleet from wooden vessels to the modern steel ships built in the 1880s and 1890s. Although many elements combined to make the navy "new," technological changes were at the heart of the transformation. Without the technological achievements of the 1870s, the comparatively rapid pace of technological change in the fleet during the 1880s and 1890s would have been difficult and perhaps even impossible. Yet the accomplishments of the 1870s have been largely overlooked. The distinguished naval historian Elting Morison, for example, has called the decade a period of "little science, less technology, little invention, and fewer ideas."[1] Other historians have shared this view. In fact, the failure to appreciate the accomplishments of the navy during this period dates from the beginning of the New Navy. Secretary of the Navy Benjamin F. Tracy, for instance, implied that the post-Civil War navy had contributed nothing to the development of technology when he claimed in 1891 that the rebuilding of the fleet was "new work, from the ground up."[2]

Historians' lack of interest in the technological achievements of the 1870s is particularly surprising given the steady process of reinterpreting the shift from the old navy to the new over the past generation. In initial accounts of the post-Civil War navy, the entire era was dismissed as the "days of our humiliation."[3] These histories described the navy as small, obsolete, beset by political corruption, and led by "ultraconservative professional" line officers.[4] Within this interpretative framework, the year 1881 serves as a "historic milestone" marking the beginning of "the process of naval reconstruction."[5] In that year the navy appointed the first Naval Advisory Board; the report of that board led to congressional authorization of new ships. In traditional accounts, the shipbuilding of the 1880s was itself a prelude to the transformation of strategic thinking begun by Alfred Thayer Mahan in 1890 with his doctrine of the use of battleship fleets to achieve command of the sea. These histories portray the 1870s as a period of "dark ages" or "doldrums" and the 1890s as a period of sudden rebirth during which the navy acquired its own prophet.[6] Although it is still possible to find writers who accept this canon uncritically, many of its assumptions have been steadily eroded.[7] The roots of Mahan's strategic thought,

The author wishes to thank K. A. Mach for her extensive editorial help in preparing this article.

1. Elting E. Morison, *The War of Ideas: The United States Navy, 1870-1890* (Colorado Springs, CO: U. S. Air Force Academy, 1969), 2.

2. Benjamin F. Tracy, "Our New War-ships," *North American Review* 415 (June 1891): 41.

3. John R. Spears, *The History of Our Navy from Its Origin to the End of the War with Spain, 1775-1898*, 5 vols. (New York: Charles Scribner's Sons, 1899), 5: 7.

4. Harold and Margaret Sprout, *The Rise of American Naval Power, 1776-1918* (Princeton, NJ: Princeton University Press, 1967), 177.

5. Ibid., 183.

6. Among the writers who share this traditional view are Edward L. Beach, *The United States Navy: 200 Years* (New York: Henry Holt & Company, 1986), 317; William Scott Peterson, "The Navy in the Doldrums: The Influence of Politics and Technology on the Decline and Rejuvenation of the American Fleet, 1866-1886" (Ph.D. diss., University of Illinois, 1986); Donald W. Mitchell, *History of the Modern American Navy from 1883 through Pearl Harbor* (New York: Alfred A.Knopf, 1946), 3-18; and Stephen Howarth, *To Shining Sea: A History of the United States Navy, 1775-1991* (New York: Random House, 1991), 215-26.

7. For examples of the revisionist writings, see Robert Seager II, "Ten Years before Mahan: The Unofficial Case for the New Navy, 1880-1890," *Mississippi Valley Historical Review* 40 (December 1953): 491-512; Lance C. Buhl, "Mariners and Machines: Resistance to Technological Change in the American Navy, 1865-69," *Journal of American History* 61 (December 1974): 703-27; Buhl, "Maintaining an 'American Navy,' 1865-1889," in Kenneth J. Hagan, ed., *In Peace and War: Interpretations of American Naval History, 1775-1984*, 2d ed. (Westport, CT: Greenwood Press, 1984), 145-73; and Hagan, *This People's Navy: The Making of American Sea Power* (New York: The Free Press, 1991), 179-85.

for example, have been traced to the 1880s. In addition, some argue that the 1870s fleet, small in size and limited in use, was a fitting tool for a national policy that was neither expansionistic nor imperialistic. Finally, senior naval officers of the 1870s have been redeemed from charges of reactionism. Despite these advances, historians have shown scant interest in investigating the participation of the United States Navy in the process of technological change that was taking place worldwide during the 1870s. Indeed, a recent history of the navy asserts that the "revolution in American naval hardware began in October 1882" when Rear Admiral Robert W. Shufeldt was named chairman of the second Naval Advisory Board.[8] In many ways this continuing neglect of technological developments within the navy during the 1870s is a strange omission, since the modernization of the navy depended as much on the introduction of new technology into the fleet as it did on the construction of new ships.

Part of the reason scholars have ignored the achievements of the 1870s may be that the navy undertook experimentation on a limited scale, reflecting the fact that it was a small agency working on reduced budgets. After the Civil War, the service shrank to prewar proportions. Generally, only forty to fifty vessels were in commission — down from almost seven hundred at the end of the war. The Navy Department budget also plummeted after the Civil War, from $122.6 million in 1865 to $21.8 million in 1870; after 1870 it drifted downward, reaching a postwar low of $13.5 million in 1880.[9] Within these budgetary constraints, Congress expected the service to deploy vessels as needed to protect the interests of the United States around the world and to keep the ships it did have in good repair; it saw no reason to make major changes in a fleet that had performed so well in the war. Indeed, because the navy possessed what historian Benjamin Franklin Cooling has called a "reservoir of weaponry" from the Civil War, Congress expected the service to draw upon this stockpile rather than to spend money for new armaments.[10] Under these circumstances, the navy could not hope to become a world leader in shipbuilding or new weapon deployment. Instead, it pursued the less glamorous but important goal of studying and, in some instances, refining the technology that Britain, France, and other countries were introducing.

8. Hagan, *This People's Navy*, 185.

9. U. S. Department of Commerce, Bureau of the Census, *Historical Statistics of the United States: Colonial Times to 1957* (Washington, D.C.: Government Printing Office, 1960), 718. All figures are for a fiscal year ending 30 June. Budgets for the Navy Department remained at approximately the 1880 level until late in the 1880s.

10. Benjamin Franklin Cooling, *Gray Steel and Blue Water Navy: The Formative Years of America's Military-Industrial Complex, 1881-1917* (Hamden, CT: Archon Books, 1979), 17.

Historians have also based their interpretations in part on the comments of contemporary officers. In 1881 Admiral David D. Porter dismissed the navy "for war purposes" as "nearly worthless, reminding one of the ancient Chinese forts on which dragons were painted to frighten away the enemy."[11] Officers also complained that the navy was "the laughing stock of the world."[12] These complaints, of course, stemmed from comparing ships of the United States Navy with newer ships of foreign powers. Such officers probably lamented not only the physical condition of the navy but also the limited professional opportunities they faced. In the late nineteenth century, naval officers experienced what Peter Karsten has called "career anxiety" over glacially slow promotions. Since "the officer's identification with his profession was total," the inability to advance was particularly frustrating. Many officers thus found themselves unwilling to leave the service but unable to achieve satisfaction within it.[13]

In considering the state of technology during the 1870s, historians have used the term "stagnation." Close examination of the period, however, proves this description to be incorrect. Despite limited resources, the navy conducted extensive research and development activities that laid the foundation for the subsequent modernization of the fleet. Much of the work involved was unsystematic, and the lines between amateur tinkerer and scientific researcher were frequently not well defined. Such a state of affairs is hardly surprising, since in the 1870s engineers and scientists were still establishing distinct professional spheres.[14] Yet, taken together, these efforts show that the navy in the 1870s studied, evaluated, and acquired new technology. It experimented with numerous ideas and was poised for the major construction program of the 1880s. The technological achievements of the 1870s are too extensive to be dismissed or ignored, as historians so often do. One important area of research involved torpedoes.

11. "Report of Admiral David D. Porter," in U.S. Department of the Navy, *Annual Report of the Secretary of the Navy, 1881* (Washington, D.C.: Government Printing Office, 1881), 95 [hereafter cited as *Annual Report of the Secretary of the Navy* with appropriate year].

12. Peter Karsten, *The Naval Aristocracy: The Golden Age of Annapolis and the Emergence of Modern American Navalism* (New York: The Free Press, 1972), 279.

13. Karsten, *Naval Aristocracy*, 250; Buhl, "Mariners and Machines," 719-23; Karsten, "No Room for Young Turks?" United States Naval Institute *Proceedings* 99 (1973): 37-50 [hereafter cited as USNI *Proceedings*].

14. Monte A. Calvert, *The Mechanical Engineer in America* (Baltimore: Johns Hopkins University Press, 1967); Samuel Haber, *The Quest for Authority and Honor in the American Professions, 1750-1900* (Chicago: University of Chicago Press, 1991), 294-318; Edwin T. Layton, Jr., "American Ideologies in Science and Engineering," *Technology and Culture* 17 (1976): 689-701; Raymond H. Merritt, *Engineering in American Society, 1850-1875* (Lexington, KY: University Press of Kentucky, 1969).

TORPEDOES AND THE ESTABLISHMENT OF THE NEWPORT TORPEDO STATION

The work of the navy in developing torpedoes provides an excellent example of the nature and limits of innovations in the service during the 1870s. Given the defensive strategy of the United States Navy during this period, the service found torpedoes an attractive weapon. Whether anchored as a mine or attached to a vessel on a spar, torpedoes promised an effective means of coastal and harbor defense. "These cheapest but most powerful weapons of defense," as Secretary of the Navy George M. Robeson called them, seemed to have "an especial value to the United States," which had a "notorious unreadiness to meet any sudden hostile emergency." Robeson predicted that a "well-developed system of torpedo warfare" would help overcome "this condition of unreadiness."[15]

To ensure that the service make the best use of torpedoes, the department created a torpedo station in July 1869 at Newport, Rhode Island.[16] There the navy worked to develop a weapon that even its supporters characterized as "still in its infancy."[17] The Newport Torpedo Station itself offered only limited facilities. When the station opened, it contained a one-story former army barracks and a number of small wooden buildings that the navy had erected when the Naval Academy had moved to Newport during the Civil War.[18] Although other buildings were soon added, the station remained small. The station employed only twenty-five men, including a chemist, a "pyrotechnist," and an electrician.[19] Congress appropriated relatively generous amounts of money to operate the station — $60,000 for fiscal year 1871 and $80,000 for fiscal year 1872.[20]

The torpedo station combined what would now be regarded as three distinct functions: the training of officers in the use of torpedoes; the manufacture of torpedoes and related equipment for vessels of the fleet; and the conduct of research and development into torpedoes and torpedo warfare. To a large degree, the apparently distinct activities of the station overlapped because the same people were involved in all. Each year from twenty to twenty-five officers attended the training school. These men studied "chemistry and electricity, the preparation of explosives, [and] the manufacture of fuzes of various descriptions for use with torpedoes." Without textbooks, the training consisted of lectures combined with extensive work with torpedoes, including firing torpedoes and maneuvering torpedo-equipped launches. In addition, officers in training assisted in the manufacture of torpedoes, so that manufacturing and instruction were part of the same program.[21]

The torpedo station also worked to improve the quality of equipment issued to vessels. Civilian specialists in electricity and chemistry conducted much of this research. For example, the station employed Moses Farmer as its electrician from 1872 to 1881. Farmer, whom *Electrical World* later commended as "one of the earliest pioneers in the field of electricity," concentrated on improving dynamos for shipboard use. Although research at Newport centered on torpedo warfare, that subject encompassed a broad range of related subjects. In addition to evaluating new types of torpedoes, the station worked with gun cotton — first examining its properties and then manufacturing gun cotton for the service. With no clear-cut division of functions at the station, specialists such as Farmer not only conducted research but also instructed students and helped in the manufacturing process. Similarly, some officers attending classes became sufficiently interested in a subject to "pursue it to invention."[22]

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15. *Annual Report of the Secretary of the Navy, 1872*, 19-20.

16. Robert W. Henderson, "The Naval Torpedo Station," USNI *Proceedings* 29 (1903): 193; U.S. Naval Underwater Weapons Research and Engineering Station, Newport, RI, *Centennial Commemoration: A Century of Undersea Technology, N.U.W.S., 1869-1969* (1969); Gerald F. Kennedy, "Goat Island, Newport, RI, Naval Torpedo Station and Successor Commands, 1869- ," in Paolo E. Coletta and K. Jack Bauer, eds., *United States Navy and Marine Corps Bases, Domestic* (Westport, CT: Greenwood Press, 1985), 213-21; Grace Herreshoff, "The U.S. Naval Torpedo Station," *New England Magazine* 26 (1902): 167.

17. "Report of Admiral [David D.] Porter," in *Annual Report of the Secretary of the Navy, 1873*, 276.

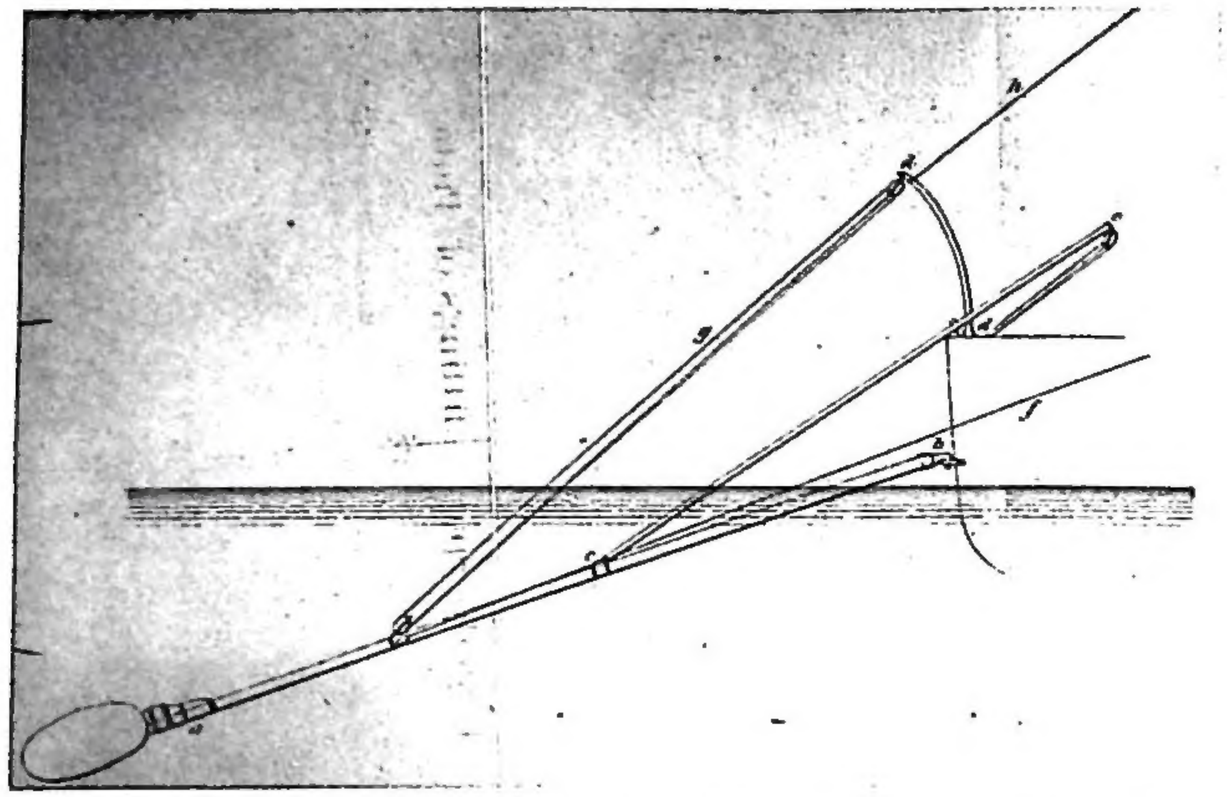
18. Henderson, "Naval Torpedo Station," 193-94; Memorandum from the Bureau of Ordnance for the Honorable Mr. Hale, to Accompany the Bureau's letter of 3rd January 1873," Letters Received by the Secretary of the Navy from Chiefs of Bureaus, 1842-85, Microcopy 518, roll 26, p. 445, National Archives and Records Service, Washington, D.C. [hereafter cited as Letters Received by the Secretary of the Navy from Chiefs of Bureaus, with the appropriate roll and page numbers, NA].

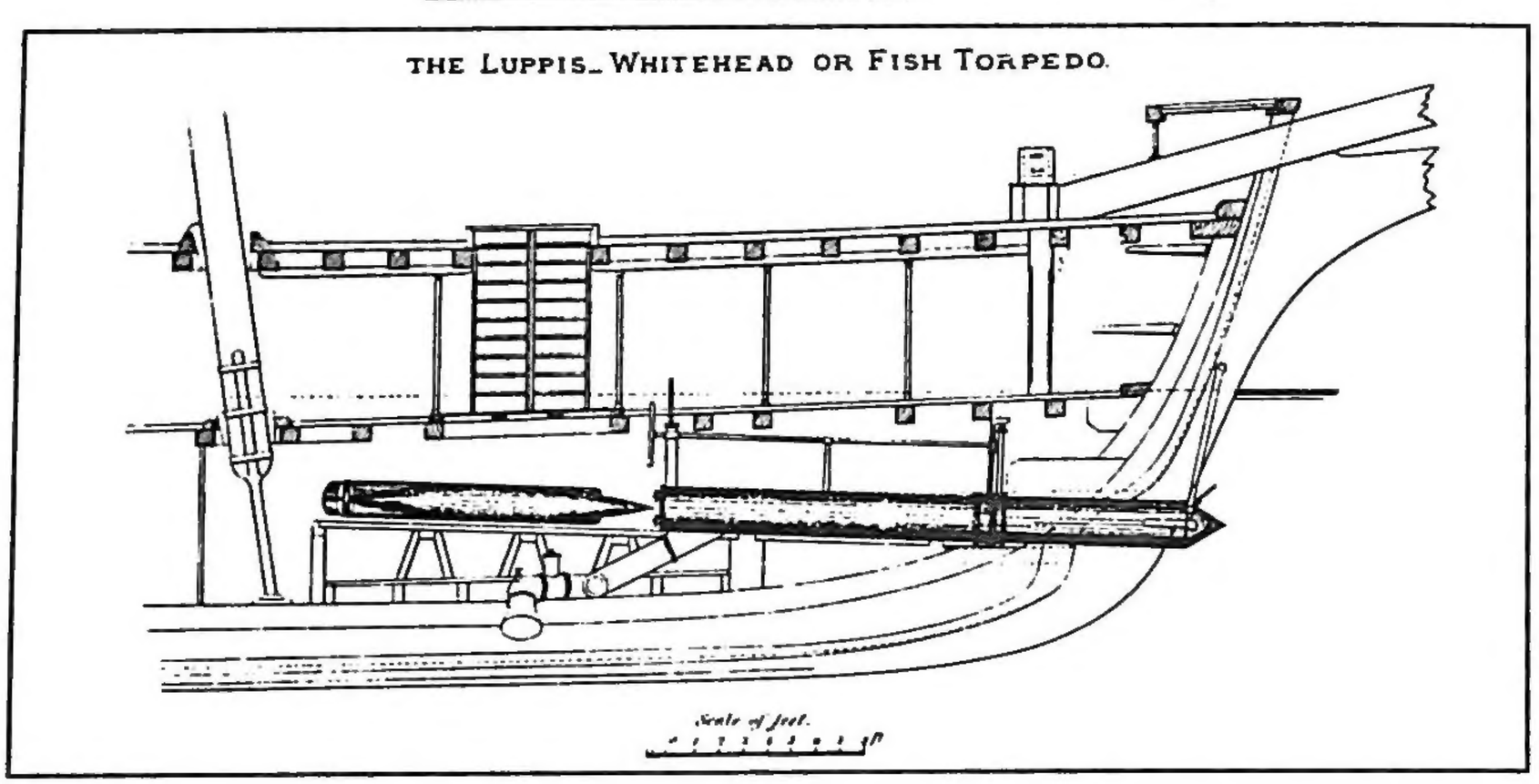
19. *United States Statutes at Large*, Act of 3 March 1873, 42d Cong., 2d sess., 17: 549.

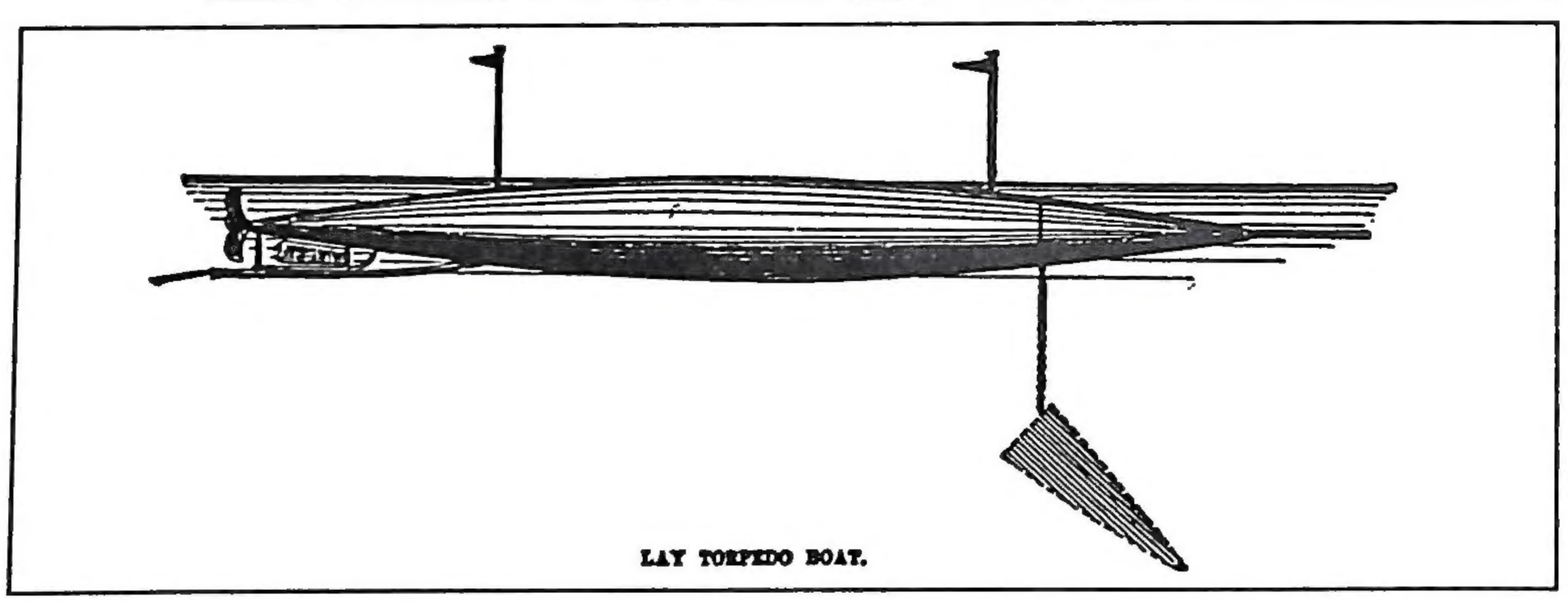
20. *United States Statutes at Large*, Act of 15 July 1870, 41st Cong., 2d sess., 16: 325, 328, and Act of 2 March 1871, 41st Cong., 3d sess., 16: 530. The appropriation for Newport during the 1870s peaked at $144,065 in fiscal year 1873, an amount that included funds for buildings; the lowest appropriations ($38,500) occurred in fiscal years 1877 and 1878.

21. William N. Jeffers, chief of the Bureau of Ordnance, to George M. Robeson, secretary of the navy, 9 May 1873, Letters Received by the Secretary of the Navy from Chiefs of Bureaus, roll 26, 671-72, NA; "Memorandum from the Bureau of Ordnance for the Honorable Mr. Hale, to Accompany Bureau's Letter of 3rd January 1873," ibid., 445-46. For a listing of subjects covered in the course, see "Report of Torpedo Station," in *Annual Report of the Secretary of the Navy, 1879*, 79-89.

22. *Annual Report of the Secretary of the Navy, 1876*, 13; "Moses G. Farmer," *Electrical World* 21 (3 June 1893): 402; "Moses Gerrish Farmer," *Dictionary of American Biography*, 22 vols. (New York: Charles Scribner's Sons, 1928-35), 6: 279-81; Herbert W. Meyer, *A History of Electricity and Magnetism* (Cambridge, MA: Massachusetts Institute of Technology Press, 1971), 74, 113, 161-62, and 192.







TOP: This diagram, from R. B. Bradford, "Report on the Torpedo Exercise of the North Atlantic Fleet," U.S. Navy Department, Bureau of Ordnance, *Torpedo Experiments at Key West, Fla.* (March 1874), plate 2, shows the arrangement of a bow-mounted spar torpedo on the 137-foot tug *Pinta*. Unfortunately, this makeshift arrangement broke when the vessel was going only four knots. CENTER: The Whitehead torpedo could be fired through a launching tube below the ship's waterline. After the torpedo was charged with compressed air and placed in the tube, water was admitted into the chamber. The torpedo was fired from the tube by compressed air, which also started the torpedo's motor. Drawing from F. M. Barber, *Lecture on the Whitehead Torpedo* (Newport, Rhode Island: U.S. Torpedo Station, 1874), plate 1. BOTTOM: The Lay torpedo ran on the surface, but the warhead could drop below the waterline as shown in this drawing from Allan D. Brown, "Torpedoes and Torpedo Boats," *Harper's New Monthly Magazine* 65 (June 1882): 44.

Most of the work at the station during the 1870s focused on the spar torpedo. An explosive charge on the end of a pole, the spar torpedo had functioned satisfactorily during the Civil War.[23] In the postwar world, however, it was a weapon of limited value. In reviewing the results of torpedo trials conducted as part of the navy's fleet exercises off Key West in 1874, the *Army and Navy Journal* dismissed the device as "a bag of powder at the end of a pole." The *Journal* pronounced this arrangement useless because, even if it survived the force of the water or enemy shells, the explosive charge could not be brought to bear against any enemy refusing to "kindly remain quiet while he is blown up."[24]

The navy, on the other hand, viewed the spar torpedo more favorably. Because cannon fire was not very accurate in this era, it was possible that in the smoke and confusion of a battle at sea, rival ships would be close enough for the spar torpedo to be put to effective use. The officer who prepared the official report on the torpedo exercises at Key West went so far as to declare that in some situations wooden ships could use spar torpedoes against ironclads. Yet even its most enthusiastic defenders admitted that the torpedo suffered from severe shortcomings.[25] To overcome these problems, the department hoped to develop a self-propelled torpedo capable of going in a straight line, at a useful speed, for a long distance. Such a device would enable the weak United States fleet to overcome even large ironclads. Although not abandoning its interest in spar torpedoes, the navy had the torpedo station evaluate proposals for a self-propelled torpedo, and Newport tested rival systems throughout the 1870s. This work represents an early and systematic research and development effort within the navy.

The United States Navy was not alone in its desire to develop a self-propelled torpedo. It kept a watchful eye on experiments in this area by European navies, and the Bureau of Ordnance occasionally reprinted articles describing the latest developments.[26] Although aware of foreign activities, the United States Navy steadfastly pursued its own course and chose not to test the Whitehead torpedo, which became the most widely used "fish" torpedo throughout the world in the late nineteenth century. Developed by an Englishman working in an Austrian armory, the Whitehead was a cigar-shaped cylinder powered by a compressed air engine and equipped with mechanisms to control speed and depth.[27] Although many European navies began purchasing the torpedo soon after its first public test in 1868, the United States Navy did not buy the weapon until the 1890s. Until that time, the Bureau of Ordnance remained convinced that "while it performs well under favorable circumstances, it is pronounced by an eminent authority but a 'mechanical toy' not adapted to the rough usage of war."[28] This opinion seemed borne out by the poor performance of the Whitehead torpedo the few times it was used in battle in its early years.[29]

Instead of purchasing the Whitehead torpedo, the United States Navy concentrated on the Lay torpedo during the 1870s. John L. Lay had served in the Union navy in the Civil War and had helped design the spar torpedo used by Lieutenant William B. Cushing against the Confederate ironclad *Albemarle* in 1864. After the war Lay continued to take an interest in torpedoes; from 1865 to 1867 he helped Peru place mines (at that time called torpedoes) in Callao harbor to protect it against a possible Spanish attack. Returning to the United States, Lay worked on an unmanned torpedo boat.[30] His craft, slightly over twenty feet long, ran almost submerged in the water; it used a "gas motive engine" and responded to electrical signals transmitted by a wire from an operator on shore or in another boat.[31] At demonstrations for the navy in the summer of 1872, Lay sent the craft around a harbor and successfully exploded a charge.[32] Although early tests of the device appeared promising, its performance had not

23. David D. Porter, "Torpedo Warfare," *North American Review* 127 (1878): 235. Porter reported that Cushing's success with the spar torpedo against the *Albemarle* helped interest him in the weapon.

24. *Army and Navy Journal* 11 (21 March 1874): 505. A week later a letter from W. N. J. (probably William N. Jeffers, chief of the Bureau of Ordnance) defended naval torpedo efforts. See ibid. (28 March 1874): 523.

25. R. B. Bradford, "Report on the Torpedo Exercise of the North Atlantic Fleet," in U.S. Navy Department, Bureau of Ordnance, *Torpedo Experiments at Key West, Fla.* (March 1874), 14-16.

26. U.S. Navy Department, Bureau of Ordnance, *Notes on Moveable Torpedoes* (Washington, D.C.: Government Printing Office, 1873), contains "Torpedo Vessels in Naval Engagements" (translated from the *Revue Maritime*, January 1873); "The Italians on the Harvey System" (translated from *Revue Maritime*, September 1872); and "Description of the Luppis-Whitehead Submarine Projectile or Fish Torpedo."

27. For descriptions of the Whitehead torpedoes, see "Description of the Luppis-Whitehead Submarine Projectile or Fish Torpedo," in U.S. Navy Department, Bureau of Ordnance, *Notes on Moveable Torpedoes*, 32; J. Lehnert, "Torpedo Vessels in Naval Engagements," translated from *Revue Maritime* (January 1873), in ibid., 6-7; and F. M. Barber, *Lecture on the Whitehead Torpedo* (Newport, RI: U.S. Torpedo Station, 1874), 3-4.

28. Jeffers to Nathan Goff, Jr., 14 January 1881, Letters Received by the Secretary of the Navy from Chiefs of Bureaus, roll 30, 302, NA.

29. Torpedoes fired by the Russians against the Turks in 1878, for example, failed to explode. See Hobart Pasha, "Systems of Offense and Defense in Naval Warfare," *North American Review* 127 (1878): 386.

30. "John Louis Lay," *Dictionary of American Biography* 11: 64-65.

31. F. M. Barber, "The Progress of Torpedo Warfare," *United Service*, new series, 3 (1880): 292-93.

32. A. Ludlow Case, chief of the Bureau of Ordnance, to Robeson, 29 April 1872, Letters Received by the Secretary of the Navy from Chiefs of Bureaus, roll 26, 162-63, NA; "Report of the Chief of the Bureau of Ordnance," in *Annual Report of the Secretary of the Navy, 1872*, 52.

significantly improved by the mid-1870s. In 1876 the chief of the Bureau of Ordnance reported that the nine-knot speed of the Lay torpedo made the boat "of no use whatever."[33]

Yet a third type of torpedo was developed by John Ericsson, designer and builder of the *Monitor*. Although the navy never showed the same enthusiasm for this weapon as for Lay's creation, Ericsson's prestige was great enough to secure a hearing. Ericsson's torpedo was twenty-five feet long, propelled by compressed air, and guided by cable. Ericsson even designed and built at his own expense a low-freeboard, double-ended boat, the *Destroyer*, to carry and fire his torpedo. Although the navy expressed interest in this torpedo and the boat, Congress never appropriated funds to purchase one from the inventor.[34]

These activities of the 1870s set the stage for the next decade, during which the navy sought in vain for an alternative to the Whitehead torpedo. It was not until 1893 that the United States Navy finally added the Whitehead torpedo to its arsenal. In the interim, the department continued to believe that a better torpedo could be developed. Admiral Porter, for example, wrote in 1888 that British tests showed that the Whitehead torpedo could not hold a course and could not be fired from a vessel running at high speed.[35] There may also have been some desire to have a torpedo that could be guided by an operator; in the 1880s the navy continued to experiment with the Lay torpedo as well as two other electrically controlled ones — the Sims and the Patrick torpedoes.[36] In addition, the service had a preference for American-built technology. In 1887 the secretary of the navy specifically identified the Patrick torpedo as one "of American invention" and felt that it had "great promise and should be encouraged."[37] This encouragement was not enough to produce a satisfactory weapon. During the late 1880s the navy was probably most enthusiastic about the Howell torpedo, first invented by a navy officer. Although this torpedo was much like the Whitehead, it did not match its competitor. If indeed the department was holding out for a domestic torpedo, it finally reached a compromise by having the Whitehead company manufacture torpedoes for the navy in the United States.[38] Throughout this long period of a search for alternatives to the Whitehead, the Newport Torpedo Station continued to be the center of research and testing for the navy.

Naval Guns

In addition to working with torpedoes, during the 1870s the navy sought to improve its guns. At the beginning of the decade, naval ordnance experts had testified to Congress that they were satisfied with the reliance on smooth-bore guns that fired solid shot.[39] In the same spirit, in 1870 the secretary of the navy confidently asserted that there was "no reason to believe we are yet behind other nations," although at the same time he asked for an appropriation to match the "large sums" European navies were spending to develop new arms.[40] Congress rejected this request and others like it throughout the 1870s. As a result, the fleet continued to carry smooth-bore, muzzle-loading cannons that were at an increasing disadvantage when compared to the steel, breech-loading rifles adopted by foreign navies. By 1881, United States ordnance was so inferior to foreign armament that Admiral Porter lamented that "we have not in our whole Navy a single first-class gun."[41]

The lack of improved ordnance that Porter decried has become a mainstay of traditional accounts of the 1870s. Officers recalled, and historians later recounted, embarrassment when foreigners looked nostalgically at the old

33. Jeffers to Robeson, 20 May 1876, Letters Received by the Secretary of the Navy from Chiefs of Bureaus, roll 28, 520-21, NA. Nine knots, however, was comparable to the speed of the Whitehead torpedo at about this time. In 1873 the navy estimated the Whitehead to have a maximum speed of 9.4 knots for a run of 800 feet. See U.S. Navy Department, Bureau of Ordnance, *Notes on Moveable Torpedoes*, 32.

34. Ericsson's biographer reports that Presidents Grant and Garfield, their secretaries of the navy, Admiral Porter, and the chief of the Bureau of Ordnance were all interested in the torpedo but that "Congress was not impressed." Ruth White, *Yankee from Sweden: The Dream and Reality in the Days of John Ericsson* (New York: Henry Holt & Company, 1960), 244-46. In the 1880s Ericsson turned his attention from the torpedo to a submarine cannon in which gunpowder fired a projectile underwater with enough velocity to strike a target at short range. He fitted the *Destroyer* for this project. See William W. Kimball, "Captain Ericsson's Submarine Torpedo System," USNI *Proceedings* 7 (1881): 340-41.

35. "Report of the Admiral," in *Annual Report of the Secretary of the Navy, 1888*, 13-14.

36. "Report of the Chief of the Bureau of Ordnance," in *Annual Report of the Secretary of the Navy, 1889*, 445; W. H. Jaques, *Paper on Naval Torpedo Warfare* (Washington, D.C.: Government Printing Office, 1886), 154.

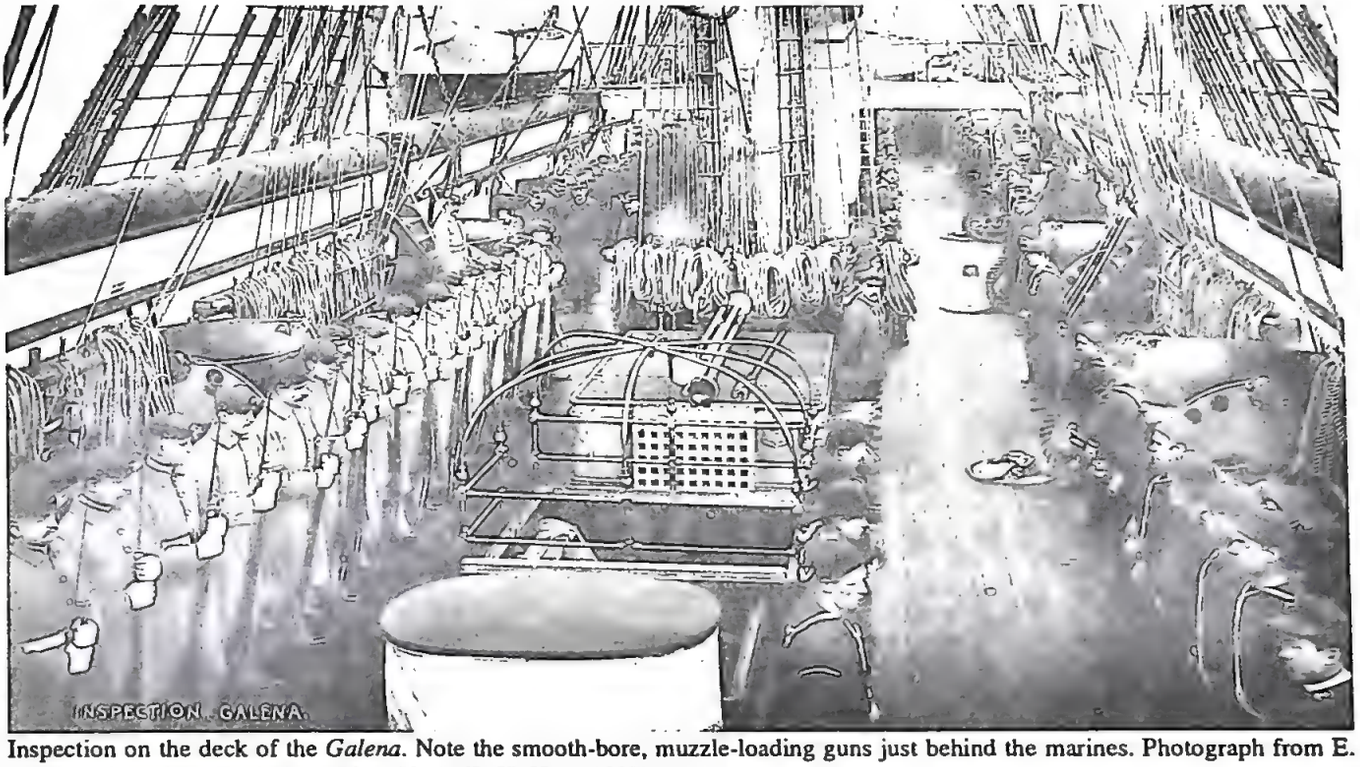
37. *Annual Report of the Secretary of the Navy, 1887*, xxvii.

38. Bruce McCandless, "The Howell Automobile Torpedo," USNI *Proceedings* 92 (October 1966): 174-76; "Annual Report of the Chief of the Bureau of Ordnance," in *Annual Report of the Secretary of the Navy, 1890*, 247; *Annual Report of the Secretary of the Navy, 1893*, 26-27; ibid., 1891, 17. The navy contracted with the E. W. Bliss Company of Brooklyn, New York, for one hundred Whitehead torpedoes in May 1891. It should also be noted that the Whitehead torpedo of the 1890s was much improved from that of the 1870s, and these improvements had overcome many of the earlier objections.

39. Richard Dwight Glasow, "Prelude to a Naval Renaissance: Ordnance Innovation in the United States Navy during the 1870s" (Ph.D. diss., University of Delaware, 1978), 44-46.

40. *Annual Report of the Secretary of the Navy, 1870*, 13.

41. "Annual Report of the Admiral," in *Annual Report of the Secretary of the Navy, 1881*, 99.



Inspection on the deck of the *Galena*. Note the smooth-bore, muzzle-loading guns just behind the marines. Photograph from E. H. Hart, *Squadron Evolutions* (New York: E. H. Hart, 1887).

guns of the United States fleet or when visiting Japanese officials remarked that they had "never seen a gun like that before."[42] Although the navy failed to match the progress of foreign navies in the area of ordnance because of limited funds, the Bureau of Ordnance took significant steps toward modernizing weapons for the fleet. These advances included the development of improved powder, the conversion of some smooth-bore guns to rifled guns, and experimentation with the manufacture of steel, breech-loading ordnance. The work that was accomplished set the stage for the development of armament for the new cruisers of the 1880s.

To facilitate testing, in 1872 the Bureau of Ordnance established the Naval Ordnance Proving Ground on the Severn River at Annapolis, Maryland. Previously, the bureau had fired guns at the Washington Navy Yard, but expanding commerce on the Potomac River made that site unsuitable.[43] The navy relied solely on the proving grounds near the Naval Academy until boat traffic on the Chesapeake Bay made it, too, unsuitable. In 1890 the department purchased land in Charles County, Maryland, and moved its testing to the new location.[44] With the opening of the Naval Ordnance Proving Grounds at Annapolis, the navy had taken another step to advance research and development. Like the slightly older Newport Torpedo Station, the proving grounds symbolized the commitment of the service to the modernization of naval ordnance.

Even before the establishment of the proving ground, Lieutenant Commander Joseph D. Marvin had been working with the DuPont Company to produce hexagonally shaped gunpowder. Immediately after the new facility opened, the navy tested the powder, which produced low pressures and high velocities. This new powder kept the United States competitive with other navies in gunpowder technology until later in the decade.[45]

As important as it was for the navy to manufacture better powder, this measure alone could not offset the increasing obsolescence of the guns in the fleet. Far from ignoring the situation, the Bureau of Ordnance initiated

42. See, for example, Alfred T. Mahan, *From Sail to Steam* (New York: Harper Brothers Publishers, 1907), 197, and Seaton Schroeder, *A Half Century of Naval Service* (New York: D. Appleton & Company, 1922), 172.

43. Case to Eugene Hale, U.S. House of Representatives, 3 January 1873, Letters Received by the Secretary of the Navy from Chiefs of Bureaus, roll 26, 440, NA; Case to Robeson, 27 March 1873, ibid., 596; Glasow, "Prelude to a Naval Renaissance," 59.

44. "Annual Report of the Chief of the Bureau of Ordnance," in *Annual Report of the Secretary of the Navy, 1890*, 252. This land later became the Indian Head Proving Grounds.

45. Albert Gleaves, "The Naval Ordnance Proving Ground," USNI *Proceedings* 15 (1889): 451; Glasow, "Prelude to a Naval Renaissance," 75-82.

several projects during the 1870s to improve armament, albeit on a shoestring budget. The first such project involved the development of a small howitzer. In 1873 the bureau began designing a new boat howitzer to replace a twelve-pound, smooth-bore gun that dated from 1849. Light enough to be carried by the crew of a ship's launch, the new gun was mounted either on the boat itself or on a field carriage for use ashore.[46] The navy could expect quick and relatively inexpensive results from this project, which had the added advantage that it permitted experimentation with new designs on a small scale. For example, in the course of developing this howitzer, the bureau studied various mechanisms for the breech. At the time, European gun makers were proposing a number of different ideas for a breech mechanism that combined ease of use with sufficient strength to resist bursting, and the United States Navy needed firsthand experience in this phase of gun design. Experiments with bronze cannons in 1874 convinced the bureau that the "interrupted screw" used in French guns provided the strongest and most versatile design. The adoption of the interrupted-screw method had an impact beyond the small-boat howitzer being developed: the same breech mechanism was used for the steel guns of the 1880s. Having decided on a breech mechanism, the bureau moved quickly to complete the howitzer. In 1875, it announced that it had successfully tested a breech-loading boat howitzer and would begin manufacture of the weapon.[47]

In developing the small-boat howitzer, the Bureau of Ordnance not only gained experience with gun design but also began to deal with the problem of securing high quality steel. In keeping with a general navy tradition, Commodore William N. Jeffers, chief of the bureau, insisted that domestic mills supply steel for the guns. Jeffers considered the development of a domestic steel industry an important part of ensuring a satisfactory ordnance supply for the navy.[48] The infant United States steel industry found that meeting specifications demanded by the department was not an easy job. Starting with the procurement of ingots for the boat howitzer, the Bureau of Ordnance worked closely with the few steel mills willing to experiment with new techniques. It was a slow process that often frustrated both the navy and private firms, but the knowledge gained in producing ingots for the howitzer proved valuable at the end of the decade when the Bureau of Ordnance sought steel castings for larger guns.

Although the development of a new boat howitzer gave the service important experience in the manufacture of modern ordnance, it did not directly address the greatest weakness of the navy: the increasingly obsolete smooth-bore guns of the main batteries of American warships. The Bureau of Ordnance waited until 1875 before it proposed converting a limited number of smooth-bore guns into rifled ordnance.[49]

The delay in addressing the issue of conversion stemmed in part from the desire of the bureau to fend off unsatisfactory proposals from outside inventors. Chief among these men was Norman Wiard, whose persistence and political connections won him contracts to convert smooth-bore guns despite objections from the navy. In 1875 he received $153,000 for trials at which "he burst four out of ten rifled guns after a very few rounds."[50] Even though Wiard persisted in seeking navy funding, the failure of his tests effectively excluded him from ordnance development. This case also reflects the desire of the navy to have direct control over innovation and to eliminate political considerations from contract awards. Although willing to work with outside individuals or firms, officers in the bureau exerted their own professional right to develop, guide, and evaluate all projects.

Wiard was not the only reason for delaying projects to convert smooth-bore cannons into more modern guns. There was a great deal of logic in completing the development of the boat howitzer before proceeding to larger undertakings. The Bureau of Ordnance also regarded conversions as at best a temporary expedient and believed that the service needed entirely new breech-loading, rifled guns such as those that the European navies had adopted. Because conversions provided only a small increase in the destructive power of the smooth-bore guns, the bureau was reluctant to begin a project that might undercut a more ambitious program. Only after it was clear that there would be no funds for new ordnance did the bureau advocate conversion, and even conversion efforts suffered from generally low appropriations. Initial funds became available only when Congress permitted the army and navy to retain money from the sale of obsolete materials.[51]

Although Jeffers would have preferred developing new large-caliber breech-loading guns with a bore of at least twelve inches, because of limited resources he

46. U.S. Navy Department, Bureau of Ordnance, *Ordnance Instructions for the United States Navy* (Washington, D.C.: Government Printing Office, 1880), 235-38, 240-56.

47. Glasow, "Prelude to a Naval Renaissance," 175-77; *Annual Report of the Secretary of the Navy, 1875*, 19.

48. Glasow, "Prelude to a Naval Renaissance," 180-86.

49. *Annual Report of the Secretary of the Navy, 1875*, 19.

50. Montgomery Sicard, chief of the Bureau of Ordnance, to Secretary of the Navy, 24 July 1882, Letters Received by the Secretary of the Navy from Chiefs of Bureaus, roll 31, 254-58, NA.

51. Sicard to Secretary of the Navy, 24 July 1882, Letters Received by the Secretary of the Navy from Chiefs of Bureaus, roll 31, 254-58, NA; Jeffers to Robeson, 29 April 1873, ibid., roll 26, 646-48, NA; Glasow, "Prelude to a Naval Renaissance," 83, 159, 163.

instead began a program to convert eleven-inch, muzzle-loading, smooth-bore guns into eight-inch, muzzle-loading, rifled guns. For its first conversions, the Bureau followed procedures that had already proved successful for the army. The bore of the cannon was first enlarged, then a wrought-iron tube inserted, and finally the rifling itself machined on the tube. The navy contracted with a private foundry for the work, and in April 1876 the service received the first of the converted guns. The department eventually converted fifty-one eleven-inch guns to eight-inch rifled guns. After conversion, the rifled cannons fired heavier shot and shell and provided a greater muzzle velocity than the old smooth-bore guns.[52]

Although the navy was proud of these converted rifles, it nevertheless had produced muzzle-loading weapons and not the more modern breech-loading guns. To investigate the manufacture of large breech-loading guns, the bureau undertook the conversion of one-hundred-pound Parrott guns — muzzle-loading rifles with 6.4-inch bores — into breech-loading eighty-pounders. Closely following a system developed by the French, the bureau designed a steel insert that fit from the breech of the gun (which had been cut off at the base ring) to "a short distance forward of the trunions." This tube then received rifling to match that of the original Parrott gun. The navy viewed this conversion as an opportunity to experiment with features not necessary for a gun of this size. For example, in order to learn as much as possible from this medium-caliber gun for use in making larger ordnance, the bureau followed the "principle of working up on smaller things the attachments that will be needed on larger" and used a "quick-pitch screw" to withdraw the breech plug instead of simple handles, which would have been acceptable for the Parrott gun conversion. With a successful test firing of the eighty-pounder in February 1877, the bureau wanted to move on to additional conversions and to the conversion of other sizes of Parrott guns, but design problems and continuing difficulties in steel manufacture delayed the completion of these additional guns until 1878 and 1879.[53]

By 1878 the bureau was prepared to tackle the more difficult challenge of manufacturing an all-steel gun. Although the conversions had given the bureau valuable experience in manufacturing modern ordnance, formidable problems remained. Jeffers nevertheless moved ahead, and by late 1878 the navy had designed a six-inch, breech-loading, rifled cannon, basing its design on features of English and French weapons. Jeffers hoped that this weapon would bring United States ordnance to the level of European navies. Developing a steel, breech-loading rifle, however, challenged not only the design skills of the bureau but also the manufacturing capabilities of American steel makers. The shortcomings of the steel industry frustrated rapid development of the new gun. Jeffers complained in his 1880 annual report: "It was only after great delay that a steel manufacturer could be induced to undertake to furnish a satisfactory ingot, and to this date — nearly two years — the gun is not completed." It was eventually necessary to set aside the preference of the navy for domestic materials and to purchase steel from England. The gun was finally completed in 1883. The navy immediately shipped the gun to the Naval Ordnance Proving Grounds for testing with various gun carriages, powders, and shells.[54] This gun served as a prototype for the guns used on the new steel cruisers of the 1880s.

Even with this experience, the Bureau of Ordnance faced an imposing task in securing the needed ordnance. *Atlanta*, *Boston*, and *Chicago*, three cruisers authorized in 1883, required eight eight-inch guns, twenty six-inch guns, and two five-inch guns. The navy secured forgings for the six- and five-inch guns from a domestic steel mill and had a six-inch gun ready for firing in February 1884. For the eight-inch gun, however, the bureau searched in vain for a domestic steel supplier and had to place orders for the forgings with English firms. The bureau complained of the "great delay" in getting these forgings, but without an alternative domestic source, it was compelled "to wait upon the convenience of foreign manufacturers." The first eight-inch gun was not finished until 1885. When Congress later authorized additional vessels with larger guns, the bureau faced similar problems in procuring steel.[55]

52. H. W. Lyon, "Our Rifled Ordnance," USNI *Proceedings* 6 (1880): 2-8; Glasow, "Prelude to a Naval Renaissance," 159-73; A. P. Cooke, *A Text-book of Naval Ordnance and Gunnery Prepared for the Use of the Cadet Midshipmen at the United States Naval Academy*, 2 vols. (New York: John Wiley & Sons, 1880), 1: 232-35.

53. Lyon, "Our Rifled Ordnance," 8-12; Glasow, "Prelude to a Naval Renaissance," 186-211; Cooke, *Naval Ordnance and Gunnery* 1: 237-40; "Annual Report of the Chief of the Bureau of Ordnance," in *Annual Report of the Secretary of the Navy, 1877*, 135.

54. "Annual Report of the Chief of the Bureau of Ordnance," in *Annual Report of the Secretary of the Navy, 1880*, 80; ibid., 1883, 412; "The Navy to the Front Once More," *Army and Navy Journal* 20 (10 February 1883): 633; Glasow, "Prelude to a Naval Renaissance," 224-32; *Annual Report of the Secretary of the Navy, 1884*, 1: 8-9 and "Annual Report of the Chief of the Bureau of Ordnance," in ibid. 1: 410-11 and 415-16.

55. *Annual Report of the Secretary of the Navy, 1884*, 1: 8-9; "Annual Report of the Chief of the Bureau of Ordnance," in ibid. 1: 410-412, 415; Sicard, "Memorandum for the Hon. Secretary of the Navy in Relation to Procuring Guns for the Steel Cruisers," 7 January 1884, Letters Received by the Secretary of the Navy from Chiefs of Bureaus, roll 32, 601-5, NA; "Annual Report of the Chief of the Bureau of Ordnance," in *Annual Report of the Secretary of the Navy, 1885*, 1: 202-203, 246; Dean C. Allard, Jr., "The Influence of the United States Navy upon the American Steel Industry, 1880-1900," (M. A. thesis, Georgetown University, 1959), 86. Once the navy had steel for the guns, it faced a similar problem in getting steel for shell casings. See, for example, "Annual Report of the Chief of the Bureau of Ordnance," in *Annual Report of the Secretary of the Navy, 1888*, 185.

Adoption of Compound Engines

The Bureau of Ordnance was not the only part of the navy interested in innovation and modernization. Other bureaus also studied new methods and their implementation. The Bureau of Steam Engineering, for example, initiated the use of compound engines. In compound engines, steam, after acting on one piston, is used to power another piston instead of being discharged into the air or a condenser.[56] Although the idea itself had been suggested as early as 1781, the proposal held little attraction in the early days of steam because early steam engines operated at pressures too low to take advantage of a second cylinder. The technique, however, promised significant reductions in coal consumption, and in the 1850s the Pacific Steam Navigation Company installed the engines in its ships and demonstrated their efficiency on routes between England and South America. Navies lagged behind private companies in this area. Finally, in 1865, the British Admiralty conducted trials comparing three identical ships, one equipped with a compound engine and two with single-expansion engines. Although the compound engine proved more efficient, British naval officers remained cautious, concerned that the greater complexity of the engine increased the likelihood of breakdown.[57]

The United States Navy had used single-expansion engines throughout the Civil War and continued to rely on them in the postwar years. Nevertheless, naval engineers followed developments in Europe. In 1871, Chief Engineer J. W. King toured European shipbuilding facilities and found that even the British navy, which was always "careful in the application of new inventions," had begun using compound engines. Upon his return, King advocated that "all cruising steamers for the Navy hereafter put afloat be engined on the compound system." He dismissed critics' concerns that high-pressure steam on board warships presented a "danger to life in the event of a projectile piercing a boiler during an engagement," because escaping steam presented the same danger to the men regardless of whether it was under twenty or eighty pounds of pressure per square inch.[58] Accepting King's recommendation, the United States Navy made this important shift in engine types at roughly the same time as European navies.

The compound engine made possible more efficient ships with greater power and expanded range. Before the navy could take full advantage of the benefits of compound engines, however, it had to solve problems that the greater steam pressure had created. Pipefittings, boilers, and lubricants all needed to be adapted to the demands of the new high-pressure machinery.[59] Attempts to solve these problems would extend into the eighties and nineties.

Development of Metal Testing

The use of high-pressure steam compelled the navy to search for solutions to problems posed by the uneven quality of boiler iron, which private contractors supplied in a competitive bidding process. The Bureau of Steam Engineering complained that frequently the winning firm supplied iron "of very inferior quality, thoroughly unfit for the purpose required."[60] To obtain suitable raw materials, the navy sought exemption from the general bidding process. In 1877, the secretary of the navy requested that Congress allow the service to purchase iron for boilers, chains, and other uses at market prices after testing for quality.[61] By March of the next year, the Bureau of Steam Engineering warned the secretary of "the probable embarrassment of the department for want of vessels owing to the lack of proper material for the construction of new boilers and the impossibility of obtaining it under the present system."[62] Responding to repeated requests, on 14 June 1878 Congress authorized the secretary of the navy "to purchase at the lowest market price, such plate iron and other material as may enter into the construction of steam boilers for the Navy, without advertising for bids."[63]

This congressional exemption applied only to boiler iron purchased by the Bureau of Steam Engineering. The Bureau of Equipment and Recruiting also faced problems

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56. Emory Edwards, *Modern American Marine Engines, Boilers, and Screw Propellers: Their Design and Construction* (Philadelphia: Henry Carey Baird & Company, 1881), 21.

57. Edgar C. Smith, *A Short History of Naval and Marine Engineering* (Cambridge: Cambridge University Press, 1938), 179-81; K. T. Rowland, *Steam at Sea: A History of Steam Navigation* (New York: Praeger Publishers, 1970), 120-21; Edwards, *Modern American Marine Engines*, 17-18; Asa Briggs, *The Power of Steam* (Chicago: University of Chicago Press, 1982), 51.

58. "Annual Report of the Chief of the Bureau of Steam Engineering," in *Annual Report of the Secretary of the Navy, 1871*, 139-42; J. W. King, *The War-Ships and Navies of the World* (Boston: A. Williams & Company, 1880), 526-36.

59. See, for example, Mortimer E. Cooley, with the assistance of Vivien B. Keatley, *Scientific Blacksmith* (New York: Arno Press, 1972), 51.

60. W. H. Shock, chief of the Bureau of Steam Engineering, to R. W. Thompson, secretary of the navy, 21 January 1878, Letters Received by the Secretary of the Navy from Chiefs of Bureaus, roll 29, 78-79, NA.

61. *Annual Report of the Secretary of the Navy, 1877*, 27-28; "Annual Report of the Bureau of Steam Engineering," ibid., 265-66.

62. Shock to Thompson, 27 March 1878, Letters Received by the Secretary of the Navy from Chiefs of Bureaus, roll 29, 212-13, NA.

63. Joint resolution to allow the secretary of the navy to purchase plate iron and other material used in the construction of the steam boilers for the United States Navy, 14 June 1878, *Statutes at Large*, 45th Cong, 2d sess., 20: 253.

in maintaining quality control over the iron it used. In 1876 the chief of the bureau reported that chain iron was breaking without undue strain. When an investigation revealed that the iron did not have the desired characteristics, the bureau established a board of officers to examine iron before purchase. Using machinery at the Washington Navy Yard, the bureau tested iron purchased by the navy as well as iron supplied by "any manufacturers who may desire it." Because iron supplied through normal contracting procedures frequently failed the test, the bureau sought, unsuccessfully, permission to purchase chain iron without competitive bidding at market value from suppliers who had passed the tests.[64]

In both these cases, the service was seeking a means to ensure the suitablity of metals to their use — a completely new problem for the navy. Although the Bureau of Ordnance had earlier developed procedures for testing the strength of metals used in cannons,[65] in the 1870s the navy expanded the scope of its metal testing. The problems the department faced in prodding manufacturers to meet the required standards foreshadowed the difficulties that the service would encounter in the 1880s and 1890s. When the New Navy began ordering steel for structural pieces and for armor and ordnance, steel mills struggled to attain uniformly high quality.[66]

ELECTRICITY

Electricity, which brought about changes in lighting, power, and communications within warships, provides yet another example of the innovative spirit of the navy. Although most uses of electrical power commercially and aboard warships were introduced after the 1870s, in that decade the navy investigated ways to exploit the emerging technology. The Naval Torpedo Station undertook most of the early work with electricity because its most immediate shipboard application was in firing spar torpedoes.

In addition to this application, the navy explored other uses of electricity. In 1874 the Bureau of Navigation reported that "the electric light bids fair to be of sufficient use to demand its trial."[67] The navy was first interested in electric lights for signaling. (Electricity was not used for illumination inside ships until after the development of a practical incandescent bulb at the end of the decade.) At the torpedo station, personnel from the Signal Office and Bureau of Ordnance worked together to test equipment that was both built by the navy and purchased from civilian sources. Even at this early date, the navy realized that signaling was only one possible application of electric lights. Other potential roles it explored included their use as running lights and as searchlights to detect torpedoes at night.[68] Signaling seemed to fit the immediate needs of the fleet, and much of the early work went into this field. By 1877 the chief of the Bureau of Navigation reported enthusiastically that electric lights "possess the utmost capacity for signaling. The rays can be projected on the clouds, or they appear like a great arm of light moving to the right or left, the combinations in movement being all that is necessary for distinct signaling at great distances."[69]

In addition to exploring the use of electicity to improve signaling, the service tested a flare pistol developed by Lieutenant E. W. Very. In 1877 the chief of the Bureau of Navigation issued a circular letter to the vessels of the navy describing the pistol. Over the remaining years of the decade, the bureau conducted trials of the system of signaling using the pistol at the Naval Academy and in the Atlantic Fleet. These trials convinced the bureau of the superiority of Very's flare pistol, which became standard equipment on all ships, and which is still in use in the navy today.[70]

64. "Annual Report of the Chief of the Bureau of Equipment and Recruiting," in *Annual Report of the Secretary of the Navy, 1876*, 104; ibid., 1877, 121.

65. Spencer Tucker, *Arming the Fleet: U.S. Naval Ordnance in the Muzzle-Loading Era* (Annapolis: Naval Institute Press, 1989), 55-56.

66. For accounts of the continuing problems in getting high-quality steel, see Cooling, *Gray Steel and Blue Water Navy*, and Allard, "The Influence of the United States Navy upon the American Steel Industry, 1880-1900." The navy, of course, was not alone in having an interest in the qualities of iron and steel. In 1875 Congress created a board composed of two army officers, two navy officers, and three civilians to determine "the strength and value of all kinds of iron, steel, and other materials which may be submitted" to it. The navy conducted tests on materials for tools, chain cable, malleable iron, and rerolling iron at the Washington Navy Yard. Other members of the board conducted tests at other locations. Congress also provided funds for a large and highly accurate testing machine that was installed in 1879 at the Watertown Arsenal in Massachusetts. See Chester H. Gibbons, "History of Testing Machines for Materials," *Transactions of the Newcomen Society* 15 (1934-35): 175-76, and *Report of the United States Board Appointed to Test Iron and Steel and Other Materials* (1876), 45th Cong., 2d sess., H. Doc. 98, viii, ix.

67. "Annual Report of the Chief of the Bureau of Navigation," in *Annual Report of the Secretary of the Navy, 1874*, 62.

68. "Report of the Chief Signal Officer," in *Annual Report of the Secretary of the Navy, 1875*, 82. For the development of the incandescent lamp, see Meyer, *History of Electricity and Magnetism*, 160-72. A practical incandescent bulb is generally dated from 21 October 1879, when Thomas Edison successfully tested a bulb using a carbonized thread filament.

69. "Annual Report of the Chief of the Bureau of Navigation," in *Annual Report of the Secretary of the Navy, 1877*, 104. See also ibid., 1875, 62.

70. William D. Whiting, chief of the Bureau of Navigation, to William H. Hunt, secretary of the navy, 2 June 1881, Letters Received by the Secretary of the Navy from Chiefs of Bureaus, roll 30, 515-16, NA; "Annual Report of the Chief of the Bureau of Navigation," in *Annual Report of the Secretary of the Navy, 1877*, 117; ibid., 1879, 116; ibid., 1882, 1:109.

As it explored innovations for immediate application in the fleet, the navy proved open to new ideas. Over the decade it sent several officers on tours of European navy yards, ordnance plants, and ships to observe and report on the latest naval developments.[71] These special reports, which the department frequently published, supplemented observations by officers aboard cruising vessels of the navy and ensured that the bureaus were aware of the latest naval technology, even when it was not possible to purchase new technology for the service. In addition to these official reports, the United States Naval Institute was founded in 1873 to encourage the spread of new ideas among the officer corps. Through meetings and its journal, the Institute reported on new technologies and fostered debate on naval matters. The first volume of the *Proceedings*, for example, contained an article by Chief Engineer C. H. Baker entitled "Compound Engines" and another by Captain W. N. Jeffers on "The Armament of Our Ships."[72]

New Ships of the 1870s

The navy examined new ideas and techniques with the obvious goal of improving the capability of the fleet; fittingly, the sixteen new ships that entered the service in the 1870s incorporated many innovations. Beginning in 1871, Secretary of the Navy George Robeson ordered the building of six steamships with money appropriated for repairs. Although the names of the old vessels were retained, the new ships were of different dimensions and contained different machinery.[73] Because Robeson had at best uncertain authority for this action, the building of these ships later formed a part of the evidence in charges of corruption in the Navy Department. The navy gained ten ships through direct congressional action. In 1871 Congress provided $600,000 to build "two iron-plated torpedo boats," and in 1873 it authorized the construction of "eight steam vessels of war with auxiliary sail-power."[74] Over the years historians have shown scant interest in any of these sixteen ships. One student of the decade claimed, for example, that the vessels authorized in 1873 could not "in any sense be considered warships."[75] In addition, accounts of the period frequently mention only the formal congressional action and neglect Robeson's "repair" program.[76]

On the one hand, it is easy to slight these ships. The fourteen cruising vessels were generally small: the *Trenton* was the largest and displaced a respectable 3,800 tons. The others were smaller, with only one displacing over 2,000 tons. Of the fourteen ocean-going vessels, moreover, only three had iron hulls.[77] These vessels also carried full sail as supplements to their steam power plants. On the other hand, these vessels can be judged in a much more charitable light. First, their size and sailing qualities fit the needs of the navy. The government, after all, wanted a navy that could cruise to distant parts of the world in support of United States commercial and diplomatic activity at minimal cost. These ships excelled at such duty. Although most major navies had abandoned wooden for iron hulls, the choice of the United States Navy had some logic behind it. These small cruising vessels would never go into direct combat with the impressive battleships or even cruisers being developed in Europe. Moreover, in the 1870s the navy had the experience and equipment for working with wooden vessels, and it had an existing stock of timber, in particular live oak. A well-built wooden ship could give years of service, and the evidence suggests that these were well built: of the five wooden steam vessels authorized in 1873, three survived into the twentieth century, and the navy did not sell the last one until 1940.[78]

71. Among those engaged in such visits were Captain Edward Simpson in 1870, Chief Engineer J. W. King in 1871 and again in 1875-76, Commander Edmund Matthews in 1872-73, and engineers Benjamin Isherwood and Theodore Zeller in 1876-77. The service also sent representatives to European expositions to examine naval and ordnance exhibits; Commander William A. Kirkland, the commanding officer of the *Guard*, reported on the Vienna International Exhibition of 1873, and Lieutenant E. M. Very filed a detailed account of the Paris Exposition in 1877. See Glasow,"Prelude to a Naval Renaissance," 64, 111, 149, 150; Edward William Sloan III, *Benjamin Franklin Isherwood, Naval Engineer: The Years as Engineer in Chief, 1861-1869* (Annapolis: Naval Institute Press, 1965), 235; "Annual Report of the Chief of the Bureau of Ordnance," in *Annual Report of the Secretary of the Navy, 1878*, 73ff.

72. Baker, "Compound Engines," USNI *Proceedings* 1 (1874): 59-72; Jeffers, "The Armament of Our Ships of War," ibid., 105-22.

73. Frank M. Bennett, *The Steam Navy of the United States* (Pittsburgh, PA: W. T. Nicholson Press, 1895), 635; Schroeder, *A Half Century of Naval Service*, 77. The ships were the *Marion, Vandalia, Galena, Swatara, Quinnebaug*, and *Mohican*. Robeson followed a similar subterfuge with the double-turreted monitors *Amphitrite, Miantonomoh, Monadnock, Puritan*, and *Terror;* in each case, a new ship was built in place of the vessel ostensibly being repaired. Work on the monitors was not completed until the 1890s. See Leonard Alexander Swann, Jr., *John Roach: Maritime Entrepreneur: The Years as Naval Contractor, 1862-1886* (Annapolis: Naval Institute Press, 1965), 141.

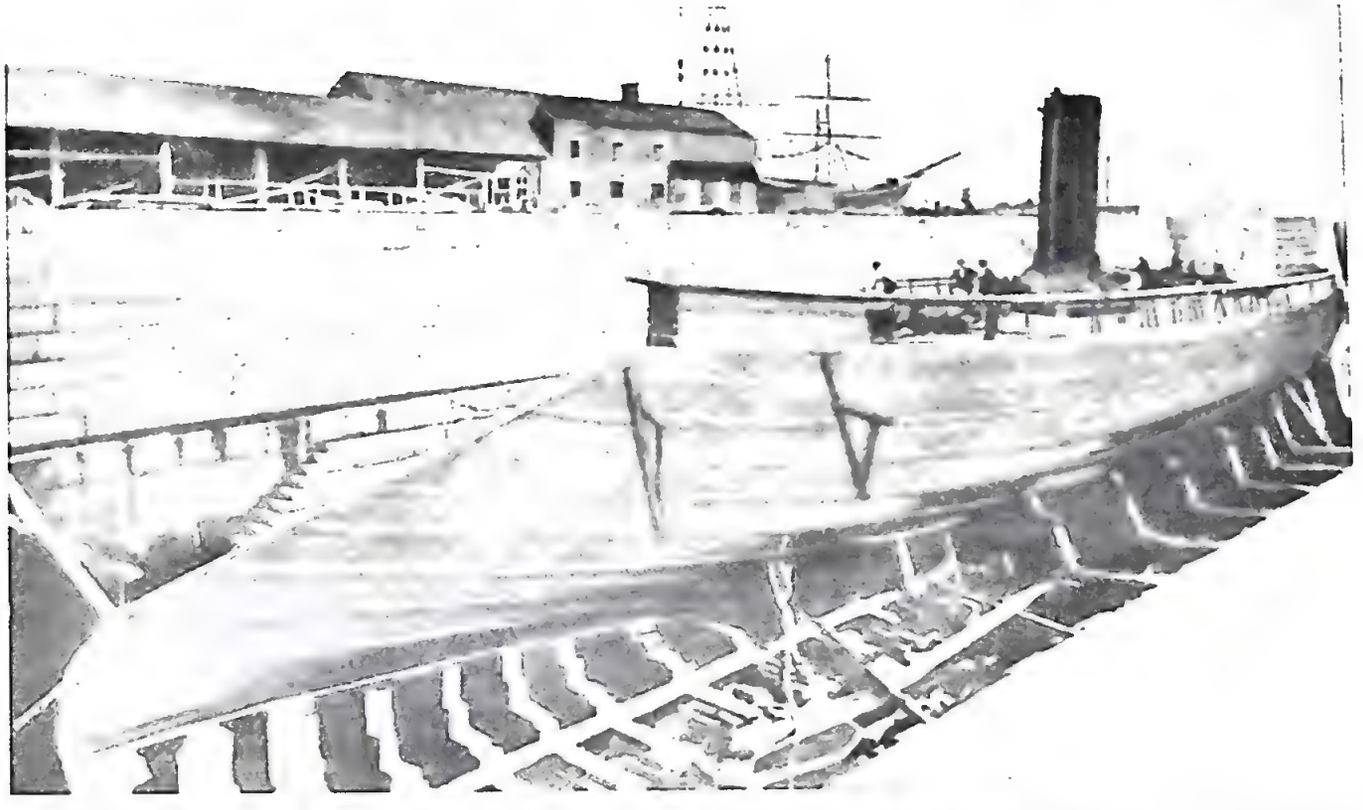
74. *United States Statutes at Large*, Act of 3 March 1871, 41st Cong., 3d sess., 16: 530; ibid., 10 February 1873, 42d Cong., 3rd sess., 17: 423; Peterson, "Navy in the Doldrums," 66. The act limited the total tonnage to 8,000 tons at a total cost not to exceed $3.2 million. The ships were the *Adams, Alert, Alliance, Enterprise, Essex, Huron, Ranger*, and *Trenton;* the harbor defense ships were *Alarm* and *Intrepid*.

75. Peterson, "Navy in the Doldrums," 67.

76. See, for example, Donald W. Mitchell, *History of the Modern American Navy: From 1883 through Pearl Harbor* (New York: Alfred A. Knopf, 1946), 4.

77. The ship over 2,000 tons was the *Vandalia* (2,033). The iron-hulled ships were the *Alert* (1,110 tons), the *Huron* (1,020 tons), and the *Ranger* (1,020 tons).

78. From U.S. Navy Department, Naval History Division, *Dictionary of American Naval Fighting Ships*, 8 vols. (Washington, D. C.:



Based on suggestions from Admiral David D. Porter, the *Alarm* carried a spar torpedo, a fifteen-inch gun, and an electric light to blind an enemy. Although not as fast or as maneuverable as the navy had hoped she would be, the experimental craft represented an attempt to bring new technologies to the problem of harbor defense. She is shown here in dry dock in a photo from Frank M. Bennett, *The Steam Navy of the United States* (Pittsburgh, PA: W. T. Nicholson, 1895), 650.

In dismissing these ships so quickly, naval historians have also missed the extent to which the navy incorporated new technology into their construction. All, for example, had compound engines.[79] Some also contained electrical devices. The *Swatara*, for example, boasted a system of electric signal bells and an electric fire alarm for the coal bunkers. The spar torpedoes on the *Swatara* could also be fired from the poop deck by means of an electrical switch.[80] The *Alarm* had an "immense electric light on her bow" whose glare would blind "her adversary to her own hull."[81]

The *Alarm* and the *Intrepid* were small torpedo craft built for harbor defense. Both were iron-hulled vessels carrying spar torpedoes. Each had an underwater ram on her bow, and the *Alarm* also boasted a single fifteen-inch, smooth-bore gun. Intended to work with the army's coastal fortifications, these vessels were designed to attack enemy warships attempting to penetrate American harbors. In the 1870s, navies were just recognizing the need for fast and maneuverable craft to carry torpedoes, and these vessels represented an attempt to meet that need. *Scientific American* called the *Alarm* "probably the most formidable craft afloat," but this claim proved unfounded by her actual performance. Neither the *Alarm* nor the *Intrepid* achieved the hoped for speed. The *Army and Navy Journal* pronounced the *Intrepid* "a complete failure" and dismissed her spar torpedoes as harmless "to anything but fishes." Nevertheless, the ships incorporated experimental features such as double bottoms and the Fowler wheel (a

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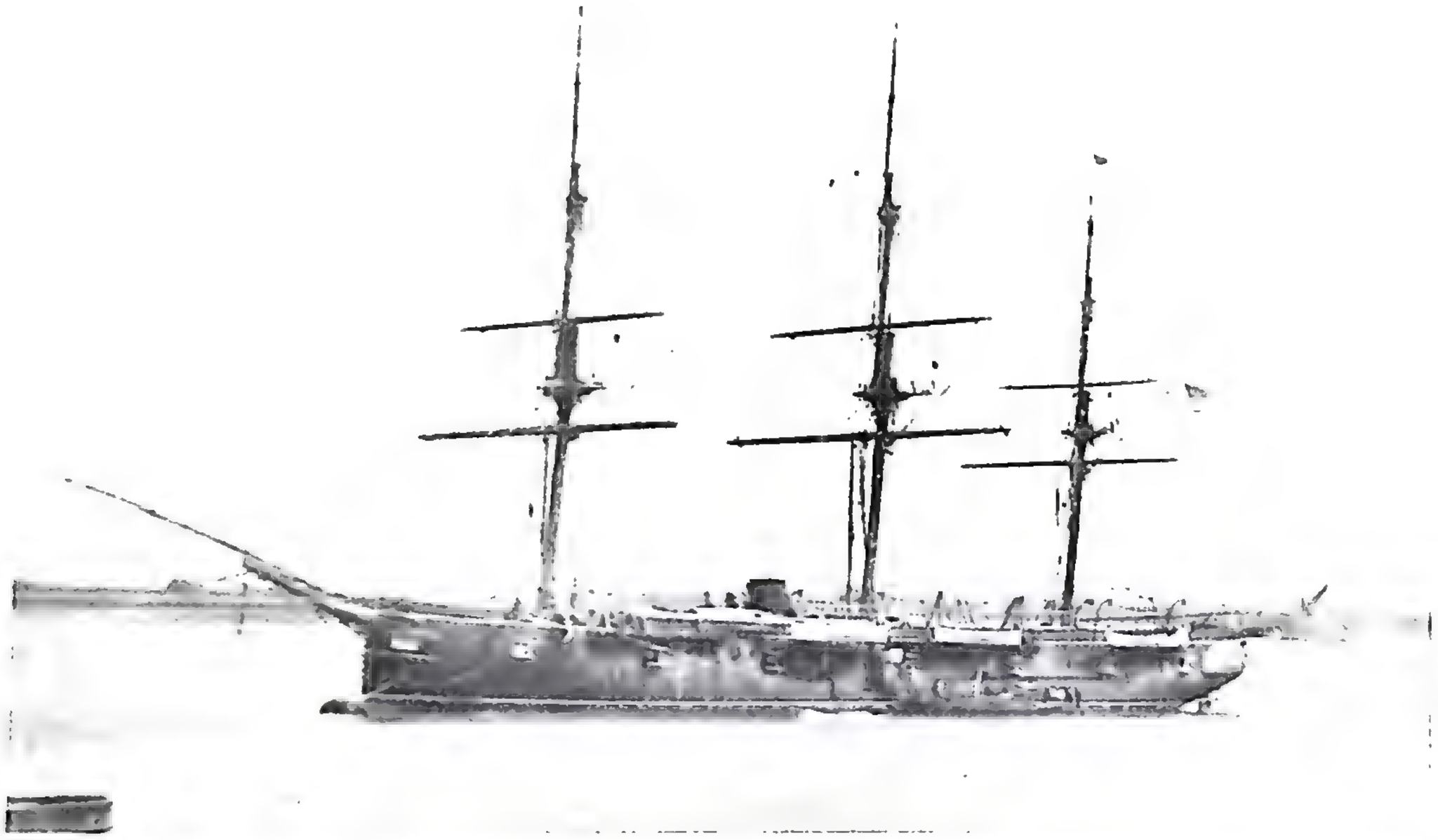
Government Printing Office, 1959-81), 1: 9, 27, and 33, 2: 356 and 367, 3: 405, 6: 30, and 7: 264-65. The two that did not survive to the twentieth century were lost at sea: the *Huron* in 1877 off Cape Hatteras and the *Trenton* at Samoa in 1889. By the twentieth century, of course, the remaining vessels were obsolete and were being used as station ships or as training ships for reserves or state militias. For wooden hulls, see Lance C. Buhl, "The Smooth Water Navy: American Naval Policy and Politics, 1865-1876" (Ph.D. diss., Harvard University, 1968), 231; *Annual Report of the Secretary of the Navy, 1879*, 26.

79. Bennett, *Steam Navy of the United States*, 643-44; Edwards, *Modern American Marine Engines, Boilers, and Screw Propellers*, 106-10.

80. *Army and Navy Journal* 13 (9 October 1875): 135. The *Swatara* was the second navy vessel to have this electrical equipment; the *Tennessee* was the first.

81. "The United States Torpedo Steamer *Alarm*," *Scientific American* 36 (17 March 1877): 159.



The *Trenton*, displacing 3,800 tons, was the largest vessel built by the navy in the 1870s and featured many innovations. Photograph from Frank M. Bennett, *The Steam Navy of the United States* (Pittsburgh, PA: W. T. Nicholson, 1895), 649.

combination rudder and screw). They also reflected a recognition of the need for specialized craft.[82]

The success of the navy in using new ideas in its ships is most apparent in the case of the *Trenton*. The service looked upon this ship with considerable pride. Two hundred and fifty-three feet long and displacing 3,800 tons, the *Trenton* provided the navy with its "new type for flag-ships." Because the *Trenton* had a live oak hull, naval historians tend to label the ship as old-fashioned even when launched.[83] Yet within its wooden hull the *Trenton* boasted a number of innovative features. Like all the other ships built in the decade, she had a compound engine. She also received the first converted guns and, thus, had the most modern ordnance in the service. The ship also had an elaborate electrical system: there were bells for the executive officer to call the master-at-arms; eight-inch gongs throughout the ship to summon the crew to general quarters and fire drills; thermostats in storerooms and coal bunkers, with remote "annunciators" that rang a bell and dropped "a shutter bearing the name of the place in which it is placed" whenever the temperature rose above 140 degrees Fahrenheit; and electrical devices for firing torpedoes and batteries from the bridge.[84] In addition to her guns and torpedoes, the *Trenton* also had a large underwater ram on the bow. Although in hindsight the ram was probably not a useful addition to the ship, naval experts of the late nineteenth century were much enamored of it, and its inclusion reflects an attempt by the navy to build the a new ship that was up-to-date.

82. R. M. G. Brown, "The U.S.S. *Alarm*," USNI *Proceedings* 5 (1879): 500-12; Bennett, *Steam Navy of the United States*, 648; "Annual Report of the Admiral," in *Annual Report of the Secretary of the Navy, 1874*, 219-20; ibid., 1875, 300; ibid., 1883, 1: 396; Robert H. Rankin, "USS *Alarm:* An Experiment," USNI *Proceedings* 91 (19 June 1965): 177-78; U.S. Navy Department, *Dictionary of American Naval Fighting Ships*, 1: 20 and 3: 445-46; *Army and Navy Journal* 13 (20 November 1875): 233 and 13 (1 January 1876): 334; "The United States Torpedo Steamer *Alarm*," 159, 162.

83. *Annual Report of the Secretary of the Navy, 1876*, 33; U.S. Navy Department, *Dictionary of American Naval Fighting Ships* 7: 264-65. Bennett, in *Steam Navy of the United States*, 647, gives the displacement as 3,900 tons. See also Peterson, "Navy in the Doldrums," 279.

84. "Annual Report of the Chief of the Bureau of Ordnance," in *Annual Report of the Secretary of the Navy, 1875*, 88; ibid., 1877, 166-169; Charles A. Stone, "A General Description of the Ordnance and Torpedo Outfit of the U.S.S. 'Trenton' (2nd Rate)" USNI *Proceedings* 3 (1877): 91-93.

Conclusion

In reviewing the decade of the 1870s as a whole, one needs to maintain a sense of balance. On the one hand, the United States Navy in 1880 was clearly a weak force composed of increasingly obsolete ships and guns; critics of the navy had no trouble finding examples reflecting the sorry state of the United States fleet. On the other hand, experimental activities of the navy during the 1870s should also be credited. Within very real limits imposed by reduced congressional funding, the bureaus of the navy studied and tested new ideas. Indeed, the examples cited above by no means exhaust the subject.[85] In addition to actual experimentation, the navy made many efforts to keep abreast of European naval developments. Throughout the 1870s, therefore, the navy actively pursued new ideas. Although work was necessarily on a small scale, the department took obvious pride in what it was able to accomplish. As a reflection of that pride, the navy rushed a newly delivered, eight-inch converted rifle to the Centennial Exposition in Philadelphia where it joined the Lay and Ericsson torpedoes and even a sample of just-tested steel hawser in the department's display.[86]

As a result of the wide-ranging interests of the 1870s, the navy was able to take advantage of the opportunities for rebuilding in the 1880s when Congress appropriated money for the first steel cruisers. Although observers then and now tend to date the beginning of the transformation of the navy into a powerful modern fleet from the Naval Advisory Boards of 1881 and 1882, or perhaps from the steel cruisers authorized in 1883, the design and construction of these ships depended on the work of the previous decade. The debates and reports of the advisory boards do not reflect an officer corps that was uninformed about modern technology. Rather, they reveal officers with a clear understanding of the choices available. These men often disagreed sharply about the choices the navy should make, but these disagreements were debates among men bringing practical and experimental knowledge to questions of technical complexity.

Although the navy faced delays and frustrations in the building of its first steel-hulled ships in the 1880s, it is worthwhile to remember the advances of the 1870s from which the work started. The navy entered upon the construction of the ships with an operating model of a steel six-inch, breech-loading rifled gun; it had begun encouraging domestic steel makers to provide steel castings suitable for the new guns; it had pushed private firms to higher standards of quality in steel production; it had behind it a decade of experimentation in the use of electricity aboard ships; and it was firmly committed to compound engines — indeed, the *Atlanta* and the *Boston*, both authorized in 1883, had the same type of engine and boilers used on the *Trenton*.[87] Furthermore, the Bureau of Ordnance entered the new decade with two well-established research facilities — the Newport Torpedo Station and the Naval Ordnance Proving Grounds at Annapolis. The rebuilding programs of the 1880s and beyond rested upon these foundations. It is time to rewrite the history of the 1870s and to recognize the science, invention, and technology of the period.

87. Bennett, *Steam Navy of the United States*, 781.

85. For example, the 1870s saw activity in fields as disparate as the development of steel wire rope and wood preservatives. See "Annual Report of the Chief of the Bureau of Equipment and Recruiting," in *Annual Report of the Secretary of the Navy, 1876*, 104-5; J. W. Easby, chief of the Bureau of Construction and Repair, to R. W. Thompson, secretary of the navy, 25 January 1878, Letters Received by the Secretary of the Navy from Chiefs of Bureaus, roll 29, 106-7, NA; Montgomery Sicard, chief of the Bureau of Ordnance, to William H. Hunt, secretary of the navy, 3 February 1882, ibid., roll 30, 749-85, NA; "Annual Report of the Chief of the Bureau of Construction and Repair," in *Annual Report of the Secretary of the Navy, 1883*, 277.

86. "Annual Report of the Chief of the Bureau of Ordnance," in *Annual Report of the Secretary of the Navy, 1876*, 113; U.S. Centennial Commission, *Report of the Board on Behalf of United States Executive Departments at the International Exhibition Held at Philadelphia, Pa., 1876* (Washington, D.C.: Government Printing Office, 1884), 11, 26, 36; Glasow, "Prelude to a Naval Renaissance," 169.

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United States Merchant Marine Casualties in World War II

JAMES E. VALLE

The ships and men of the United States Merchant Marine constituted one of the smallest of the American services which saw action during World War II. They were also among the most heavily engaged, participating in every major theater of war and sustaining exceptionally heavy casualties by American standards. During the period from 1941 to 1945, approximately 6,000 civilian-manned merchant ships sailed under the American flag as part of either the Maritime Commission's War Shipping Administration (WSA) pool or the Army Transportation Service fleet.[1] An undetermined number of additional vessels sailed as American-owned ships flying flags of convenience and were either fully or partially manned by American civilian seamen. There was also a fleet of foreign and confiscated Axis-owned ships that operated under charter by the Maritime Commission with some American personnel on board to supplement predominantly foreign crews.[2]

According to the most authoritative tabulations available, 624 of the 6,000 American flag vessels were sunk by enemy action, 130 were damaged, 2 were captured and used by the Japanese, 27 were deliberately scuttled to form artificial harbors off the Normandy beachheads, and 82 became marine casualties.[3] Thus, statistics show that about 12 percent of American merchant ships were sunk during or just after the war and a further 2 percent were damaged but not sunk.

Approximately 290,000 civilian seafarers served in the Merchant Marine and Army Transportation Service at one time or another during the hostilities.[4] Of this number, 114,145 received the Merchant Marine combat ribbon, indicating that they had been engaged in combat action. At least 6,103 men were killed while serving on merchant vessels. This averages to 9.8 fatalities per sinking or approximately 20 percent of a typical crew of 50. A further 1,760 men were wounded, and 609 were taken prisoner, 54 of these dying in Japanese prisoner-of-war camps. These numbers indicate that the Merchant Marine and Army Transportation Service had 39 percent of their total strength engaged in hostilities and suffered 2.8 percent fatal casualties, the highest total of any service except the Marine Corps. The ratio of killed to wounded was extraordinarily high at 3.46:1.[5]

Of the 609 seamen who were detained, figures developed separately by Captain Arthur R. Moore and Charles Dana Gibson indicate that 440 were captured off of U.S. flag vessels and 169 were interned after being

1. Statistics related to the size of the wartime Merchant Marine vary somewhat from source to source. I have used Eloise Engle and Arnold Lott, *American Maritime Heritage* (Annapolis, MD: Naval Institute Press, 1975), 306-307. The Army Transportation Service fleet stood at 185 seagoing ships directly controlled by the army and another 1,500 "allocated" to the army from WSA. See *Army Ships and Watercraft of World War II* (Annapolis, MD: Naval Institute Press, 1987), 3-4. Ships counted are those over 1,000 gross tons.

2. These ships, sixty-four in all, were confiscated in early 1941. See Thomas A. Bailey and Paul B. Ryan, *Hitler vs. Roosevelt* (New York: The Free Press, 1979), 180.

3. Once again, statistics vary from source to source. I have used figures developed by Arthur R. Moore, *A Careless Word . . . A Needless Sinking*, rev. ed. (Kings Point, NY: American Merchant Marine Museum, 1985), esp. 543-546, and checked them against those presented during the hearings conducted by the House Committee on Merchant Marine and Fisheries relative to H.R. 679 on 13 August 1986. Even these are not always in complete agreement.

4. That is, 270,000 Maritime Commission seafarers and 20,000 Army Transportation Service civilian seafarers. The only difference between them is that the USMC seafarers were unionized while the ATS men were direct employees of the federal government under civil service.

5. See the statement of the Hon. John A. Gaughan, Administrator, Maritime Commission, *Hearing Before the Subcommittee on Merchant Marine of the Committee on Merchant Marine and Fisheries, House of Representatives, Ninety-Ninth Congress, Second Session* on H. R. 679, Serial No. 99-60 (Washington, D. C.: Government Printing Office, 1987), 31-32. It is possible that additional deaths occurred which have gone unrecorded. Some merchant seamen may have died of wounds while being treated in civilian hospitals both in the United States and overseas. There was no uniform system to account for merchant mariners admitted to civilian hospitals, and it is likely that some men died in them without any report being made to the Coast Guard or Maritime Commission. How many additional deaths could be added to the current known total from this source can only be speculated upon, but it may be a significant number.

found ashore in ports overrun by the Japanese. Approximately 47 merchant seamen were held at Stalag Marlag and Milag Nord near Bremen as German POWs. The rest were captives of the Japanese, who held 233 as POWs and the remaining 329 as civilian internees. Apparently 54 of the POWs died in captivity, including 2 who were executed upon capture. A further 8 merchant seamen died in internment camps, for a total of 62 deaths among all categories of detained merchant seamen. The Japanese practice of holding two categories of merchant marine detainees was rooted in principles of International Law, which held that a merchant seaman taken from on board a ship was a legitimate prisoner of war, but that one who was captured while separated from his ship or while not serving in a particular ship was a civilian and belonged in an internment camp where treatment was much less severe. To complicate matters further, the Japanese were not always consistent in applying the rules and on occasion accepted prisoners taken by German submarines and raiders operating in the Indian Ocean.[6]

The geographical spread of U.S. casualties can best be understood by an analysis of the ocean areas in which the ships were sunk (see table 1 on page 22). The American Merchant Marine had a slightly different experience than the combined Allied merchant marines, which sustained 76 percent of their losses in the North Atlantic.[7] The United States lost about 251 ships on the North Atlantic/Arctic routes, not including the 27 deliberately sunk at Normandy. Approximately 133 ships went down in the Caribbean/Gulf of Mexico area, making this a major killing ground. Forty-two ships were lost in the South Atlantic, including 5 to surface raiders, and 45 were lost in the Mediterranean, including a significant number bombed and sunk in port or at anchor. Forty ships were sunk in the Indian Ocean/Red Sea, including 2 by surface raiders. The Pacific Ocean accounted for 52 ships lost, including 2 to surface raiders and 2 captured.[8]

A further analysis of these figures shows that 24 percent of ship losses occurred in areas where the convoy system was absent or intermittent, such as the Pacific, South Atlantic, and Indian Oceans. Furthermore, 263 ships were lost in the North Atlantic and Caribbean/Gulf areas in the first six months of 1942 before effective convoy systems were organized throughout the Western Hemisphere. This is 44 percent of the total losses for the entire war and more than 64 percent of the losses sustained in the North Atlantic and Caribbean/Gulf areas for the full duration of the war. Before the advent of a full convoy system, ship losses averaged 45 per month, but after convoying became general, losses dropped to an average of 11 per month by 1944.[9]

Obviously, the time it took to get the Merchant Marine completely "buttoned up" for war was the most costly period of all, and this process took virtually the entire year of 1942. Consequently, that year alone accounted for almost half of all ship casualties recorded, or 47 percent (see table 2 on page 22).

This pattern of losses, heavily weighted towards the early months of the war, reveals another interesting fact. It is customary to think that the Merchant Marine was a war-built fleet and that the Emergency-type ships, particularly the Liberties, bore the brunt of casualties. An examination of the casualty reports compiled by Moore, however, shows that this is not the case. During World War II there were six broad categories of ships which made up the Maritime Commission and Army Transportation Service fleets. These were, in order of age: pre-World War I ships and ships purchased from foreign sources; Emergency Fleet ships constructed between 1917 and 1922; interwar ships constructed between 1923 and 1936; Maritime Commission standard types built between 1937 and 1942; Emergency types (i.e., Liberties and Victories) built from 1941 to 1945; and Maritime Commission standard types built from 1942 to 1945. Losses among these categories were extremely uneven, reflecting the relative numbers of each type being operated and, most of all, the ships that were available to sustain maritime traffic during the crisis year 1942 (see table 3 on page 22).

This table shows that ships of the World War I Emergency Fleet program formed the mainstay of the American Merchant Marine in the first year of the war and suffered the heaviest casualties of any type in use throughout the war. They also formed the vast majority of the ships sacrificed during the Normandy breakwater operation, along with a few Liberties. It cannot be stated with complete accuracy just how many World War I ships, of the approximate total of 2,500 that were built, served in the Merchant Marine during World War II. Some were scrapped, sold foreign, or lost as marine casualties between the wars. Perhaps as many as 1,800 sailed under the American flag during the war, making them the most

6. See Moore, *A Careless Word*, 495 and 528-532, and Charles Dana Gibson, "Prisoners of War vs. Internees — The Difference as Judged by the Experience of World War II," unpublished MS furnished to me by Mr. Gibson.

7. See Terry Hughes and John Costello, *The Battle of the Atlantic* (New York: The Dial Press/James Wade, 1977), 305.

8. These figures were compiled by a tabulation of the data in Moore, *A Careless Word*, chapter 1, section 1.

9. These figures were obtained by graphing the sinkings documented by Moore and listed in *A Careless Word*, 543-546.

Table 1
Ship Losses by Sea Area[10]

North Atlantic/Arctic	278 ships	47%
Caribbean/Gulf	133 ships	23%
Pacific Ocean	52 ships	9%
Mediterranean	45 ships	8%
South Atlantic	42 ships	7%
Indian Ocean/Red Sea	40 ships	6%
Totals	590 ships	100%

Table 2
Ships Lost and Damaged by Year, 1941 — 1945[11]

September 1939 - 7 December 1941	6 ships	1%
December 7 - 31 December 1941	14 ships	2%
1942	373 ships	47%
1943	204 ships	26%
1944	130 ships	16%
1945 (all 12 months)	68 ships	7%
Totals	795 ships	99%

Table 3
Ship Losses by Type During World War II[12]

Pre-WWI and ships of miscellaneous origin	67 ships	11%
WWI Emergency Fleet types	306 ships	49%
Interwar construction, 1923 - 1936	18 ships	3%
USMC standard types, 1937 - 1942	34 ships	5%
Emergency types, 1941 - 1945	180 ships	29%
USMC standard types, 1942 - 1945	19 ships	3%
Totals	624 ships	100%

10. Ibid., chapter 1, section 1. Percentage calculations are my own. The Normandy breakwater ships are not included in this table, nor are seven others for which Moore does not supply data.

11. Ibid., 543-546. All ships that Moore lists are included here.

12. Ibid. Moore lists the builder and launch date of each ship cited in *A Careless Word*. The Normandy ships are included here, but damaged ships are not included, nor are ships for which Moore could find no data. From this data it is possible to compile the table. The prominence of Emergency Fleet ships among the World War II casualties was a revelation to this author.

numerous type of vessel operated after the Liberties, which numbered 2,710 ships. If these figures are correct, the Emergency Fleet ships suffered a loss rate of 17 percent as opposed to a 6 percent loss rate for the Liberties. The World War I era ships also suffered a higher loss rate of personnel when they were sunk because their lifesaving equipment was obsolete and often in poor condition, especially in 1942. Many of these "rustbuckets" were still operating in 1945 but were scrapped en masse soon after hostilities ended.[13]

Another area of interest is the number of ships damaged by enemy action. Moore lists a total of 130 American flag merchant ships that were damaged in some way during the hostilities. Comparing ships sunk to ships damaged yields a ratio of 589:130 or 4.5:1. This ratio is quite high by naval standards and indicates a much lower survivability rate for merchant vessels once hits have been scored on them. Lack of compartmentalization, smaller crews, absence of any real damage control doctrine, and the tendency of merchant marine crews to begin abandoning stricken ships almost immediately, all contributed to this ratio.

If we regard this subset of 130 damaged ships as a random sample of attacks launched by all Axis forces on American merchantmen, we can postulate that German submarines were the most deadly aggressors, followed by German mines, Japanese aircraft, German aircraft, Japanese submarines, and German shellfire. Losses inflicted by Italian forces were negligible, as were those caused by surface raiders.[14] (See table 4 on page 26.)

Additional information comes from an analysis of war losses due to marine casualties. These were vessels lost to the normal hazards of the sea and, perhaps, to some abnormal hazards imposed by wartime conditions but not directly related to enemy action. American merchant ships were obliged to run without showing normal running and range lights, to cope with blacked-out aids to navigation, to ship large numbers of green hands, and to make do with very hastily trained junior officers, some of them sailing on "emergency" tickets. Also, there was greater potential for collision because of the need to sail in convoy, and many ships were sent to sea overloaded and in doubtful condition, especially early in the war. Structural faults in some of the newly built ships were also a factor.

With so many adverse conditions to cope with, the actual number of marine casualties was surprisingly low. Approximately eighty-two ships, or 1.4 percent of those operated, became total constructive losses between 1942 and 1945. Of course, there were many other ships that were damaged as a result of accidental mishaps but were later salvaged and returned to service. Even vessels with catastrophic structural failures sometimes survived. Table 5 on page 26 lists the numbers lost to each major hazard.

Although they represent only a small percentage of marine casualties, the ships that were lost to structural failure gave rise to many rumors which eventually led to a full-scale congressional investigation. The Liberty ships took the brunt of criticism, although out of the huge number built, only six are known to have been lost this way.[15] Contrary to popular belief, Liberty ships were not designed to have a temporary or limited lifespan. They had all the structural components of a normal ship of their size and intended use, and the materials that went into their construction were of the customary dimensions and quality. They were, of course, built quickly, making extensive use of welding and prefabrication. In adapting the original British design for American use, Gibbs and Cox, the naval architects hired by the Maritime Commission, cut away the sheer strake to accommodate a different type of gangway, thus unwittingly creating a weak spot almost exactly amidships. Poor quality welding, done in some shipyards that paid their personnel on a piecework basis, further exacerbated the problem. Once the problems were recognized, however, corrective measures were taken and no further losses of Liberty ships due to structural failure were reported.[16]

In fact, the greatest cause of accidental loss among Liberty ships was being driven ashore in bad weather, a problem that also afflicted the Emergency Fleet ships. Both types of vessels were low-powered for their displacement, and the combination of a severe gale catching one

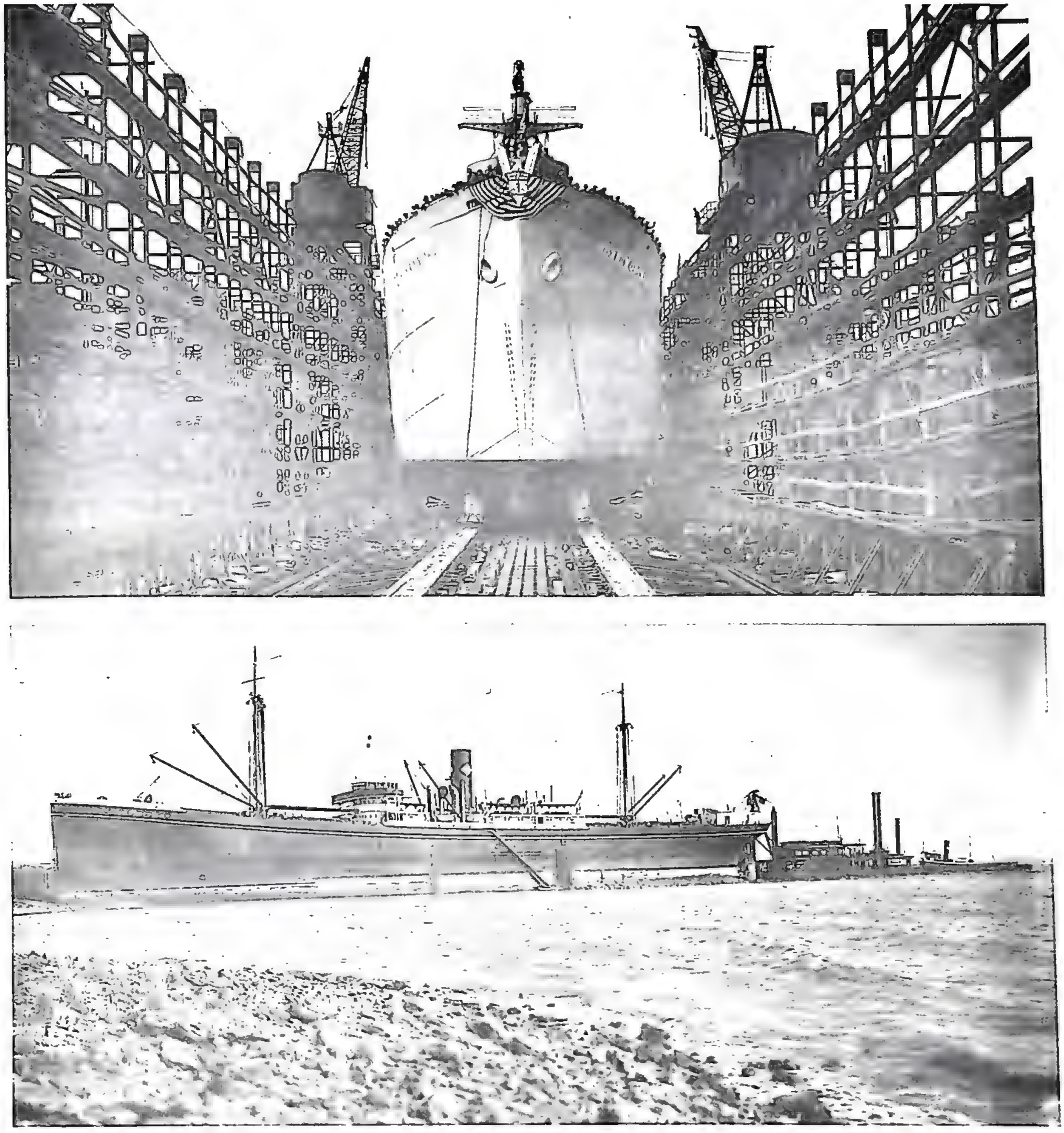
13. See Glover, *Army Ships and Watercraft*, 66. This author recalls seeing a few "Laker" class freighters serving with the Olsen Lines as lumber carriers on the West Coast in the 1950s as well as a few "Arrow" class tankers carting oil for Texaco.

14. See Moore, *A Careless Word*, chapter 1, section 2. In addition, Glover lists 171 Army Transportation Service vessels sunk along with the cause of their loss in *Army Ships and Watercraft*, 61-64. The results are very similar. Forty-four percent were lost to submarines, 18 percent to air attack and 8 percent to mines. One ship was captured, two sunk by gunfire, three by surface raiders, and one by a torpedo boat.

15. These were the *J. L. M. Curry*, *John P. Gaines*, *Joseph Smith*, *Samuel Dexter*, *Thomas Hooker*, and *Joel R. Poinsett*. Of course, other Liberties came close to foundering due to serious hull fractures but made port after emergency repairs had been performed by the crew. A statistical study carried out in 1944 as part of a Congressional investigation indicated that 12.5 percent of Liberties operated during 1942 and 1943 proved to have defective welding. Ten percent developed cracks, and one ship in thirty suffered a major fracture. See L. A. Sawyer and W. H. Mitchell, *The Liberty Ships* (Newton Abbot, England: David and Charles, 1970), 19.

16. See Frederic C. Lane, *Ships for Victory* (Baltimore: The Johns Hopkins University Press, 1951), 588, and Sawyer and Mitchell, *The Liberty Ships*, 19-20.

TOP: This view of a Liberty ship underway in an American port typifies the state of the Merchant Marine in the early months of World War II. Although extra lifesaving gear is in place, the vessel's armament is woefully incomplete. There is only one gun aft and a small machine gun forward. All of the 20mm gun tubs are empty. Photo courtesy of the United States Coast Guard. BOTTOM: Wartime shipbuilding went on around the clock at U.S. shipyards like this one at Baltimore, utilizing assembly line methods and relying heavily on welding. These methods resulted in some casualties, but the efficiencies justified the risks, and most of the ships were serviceable. Photo courtesy of the Library of Congress.



TOP: The Liberty ship *John Woolman* slides down the ways at Baltimore's Fairfield Shipyard in April 1943. Operating after the crisis months had passed, her career was relatively uneventful, although she was mined and damaged in the English Channel in May 1945. She was scrapped in 1960. Photo courtesy of the Library of Congress. BOTTOM: The freighter *Robin Goodfellow*, shown here when she ran aground in Delaware Bay in the 1920s, went missing with all hands in the South Atlantic in July of 1944. Because of the diligent efforts of Jürgen Rohwer and Captain Arthur Moore, we now know that she was torpedoed by U-862 (Kaptlt.Timm) on 25 July approximately five hundred nautical miles northwest of Walvis Bay, South West Africa. Forty-one merchant seamen and nineteen Naval Armed Guards were lost with her. Photo courtesy of the Delaware Division of Historical and Cultural Affairs.

Table 4
Causes of Merchant Ship Damage, 1941 - 1945

Torpedoed by submarines:	German	51 ships	38%
	Japanese	11 ships	8%
	Italian	0 ships	0%
Torpedoed by aircraft:	German	2 ships	1.5%
	Japanese	3 ships	2%
	Italian	0 ships	0%
Bombed by aircraft:	German	12 ships	9%
	Japanese	9 ships	7%
	Italian	0 ships	0%
Crashed by aircraft:	Japanese only	14 ships	11%
Shelled by submarine:	German only	2 ships	1.5%
Shelled (shore batteries):	German only	6 ships	4%
Mined, European waters		18 ships	14%
Mined, Pacific waters		2 ships	1.5%
Totals		130 ships	97.5%

Table 5
Non-combat Marine Casualties in World War II[17]

Grounding, stranding, and driven ashore	37 ships	45%
Collisions with other ships	26 ships	32%
Structural failures	8 ships	10%
Fire and explosion	6 ships	7%
Foundered in storms	5 ships	6%
Totals	82 ships	100%

of them with a lee shore in the offing and inexperienced officers on the bridge proved fatal on too many occasions. Inexperience may also have contributed to some of the collisions, along with crowded harbors, the difficulties of keeping station in convoys, the need to run without lights, and the general urgency of wartime operations. Given all of the difficulties that had to be overcome, it seems that the American Merchant Marine operated with reasonable safety and competence throughout the war years.

In accounting for ship losses sustained by the Merchant Marine, one further category is of interest. A total of thirty-five ships went missing with all hands in such a way that their fate could not be accounted for during the war. Virtually all of these vessels had been sailing alone or straggling from convoys when they were lost. An analysis of Axis records after the end of hostilities revealed that all of them had been sunk by German or

17. These figures derive from Moore, *A Careless Word*, chapter 1, section 2 and are compiled from statistics related to all ships lost. The subset of 1,706 oceangoing ships operating under Army Transportation Service orders seemed to suffer much higher marine casualties. Forty were lost, or 2.3 percent. Causes were: grounding, 21 ships (52 percent); collision, 9 ships (23 percent); fire/explosion, 6 ships (15 percent); broke up, 2 ships (5 percent); foundered, 2 ships (5 percent). See Glover, *Army Ships and Watercraft*, 61-65.

Japanese submarines or surface raiders. Apparently there were no wartime ship losses for which we cannot now account.[18]

Mine warfare had played a significant part in World War II, and not all of the devices that were planted could be recovered immediately. Twelve ships were lost and eight damaged by mines after the end of the war. All but one of these losses occurred in European waters. The last ship to be a casualty of mine warfare was the *St. Lawrence Victory*, damaged by a mine in the Adriatic in 1947. This is doubly ironic because the very first American merchant ship to be lost in the war, the *City of Rayville*, had struck a mine seven years earlier off the south coast of Australia.

The losses in ships and men sustained by the American Merchant Marine and its counterpart, the Army Transportation Service, were grave and painful to bear, but they need to be put in perspective in order to achieve an objective understanding of their significance. The loss of 817 American merchant ships and 6,103 American merchant seamen contrasts with the British merchant navy's sacrifice of 2,177 ships and 30,132 seamen. British loss of life per sinking was higher as well, averaging 26 percent of a typical crew as opposed to the American 20 percent.[19] Merchant seamen of the Axis nations were even more severely tested. The Japanese merchant marine was all but wiped out, its personnel suffering 79 percent fatal casualties.[20] No figures have yet been developed to quantify the losses of the Norwegian, Danish, Dutch, and Belgian merchant marines, contingents of which served on both sides, but it is probable that they were even heavier than the British casualties.

Compared with these fleets, the American Merchant Marine actually got off rather lightly. Wartime rumors to the contrary, few ships were lost because of structural failure, and there is no record of any ordinary trade convoy ever being completely wiped out.[21] Of the infamous Arctic convoys, the majority experienced light to moderate losses, and some had no casualties at all. PQ-17's heavy losses were due to exceptional circumstances rather than the inherent danger of the run.[22]

It is now nearly fifty years since these casualties were sustained. The time has come for wartime rumors and colorful memories to be checked against the actual record so that what really happened can be known and understood with clarity and accuracy.

18. Moore has accounted for all the missing ships in *A Careless Word*, presumably utilizing data furnished in Jürgen Rohwer, *Axis Submarine Successes, 1939-1945* (Annapolis, MD: Naval Institute Press, 1983), esp. Index D. Rohwer describes the Axis and Allied records he consulted to compile his data on pp. ix-xiv.

19. These figures are derived from Admiralty Trade Division Records and are cited in Hughes and Costello, *Battle of the Atlantic*, 304.

20. Y. Horie, "The Failure of the Japanese Convoy Escort," United States Naval Institute *Proceedings* 82, no. 10 (October 1956): 1073-1081.

21. The closest instance was Convoy TM-1, a tanker convoy running from Trinidad to Gibraltar in January 1943. It lost seven out of nine ships. See John W. Waters, Jr., *Bloody Winter*, rev. ed. (Annapolis, MD: Naval Institute Press, 1984), 121.

22. The controversy surrounding PQ-17 will probably never be laid to rest. It was the only Arctic convoy ever deliberately scattered. Contrary to wartime legend, its escort was not afraid of the *Tripitz* but rather of the German *Luftwaffe*. The British Admiralty, cognizant of the lesson learned when the *Prince of Wales* and *Repulse* were sunk, did not want to operate capital ships against the *Tripitz* without adequate air cover. They had hoped to grapple with the *Tripitz* before the convoy got beyond the range of British aircraft, but when it sailed into the region of North Cape that was no longer possible, and the heavy units withdrew. The convoy was then scattered and the individual ships decimated by U-boats and aircraft. Had the convoy been held together it probably would have been able to fight off the *Luftwaffe* much more effectively and would have suffered a more normal casualty rate.

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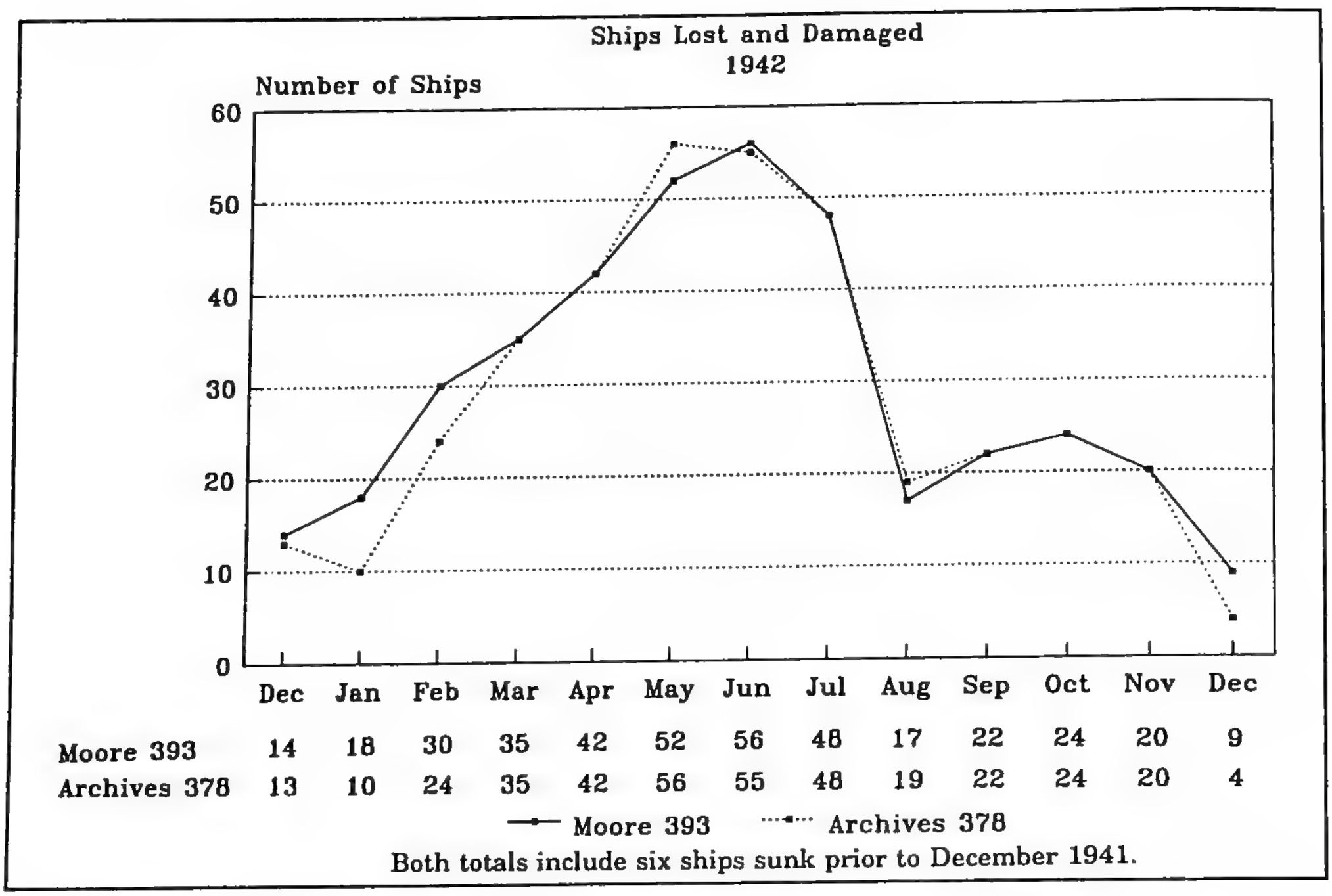
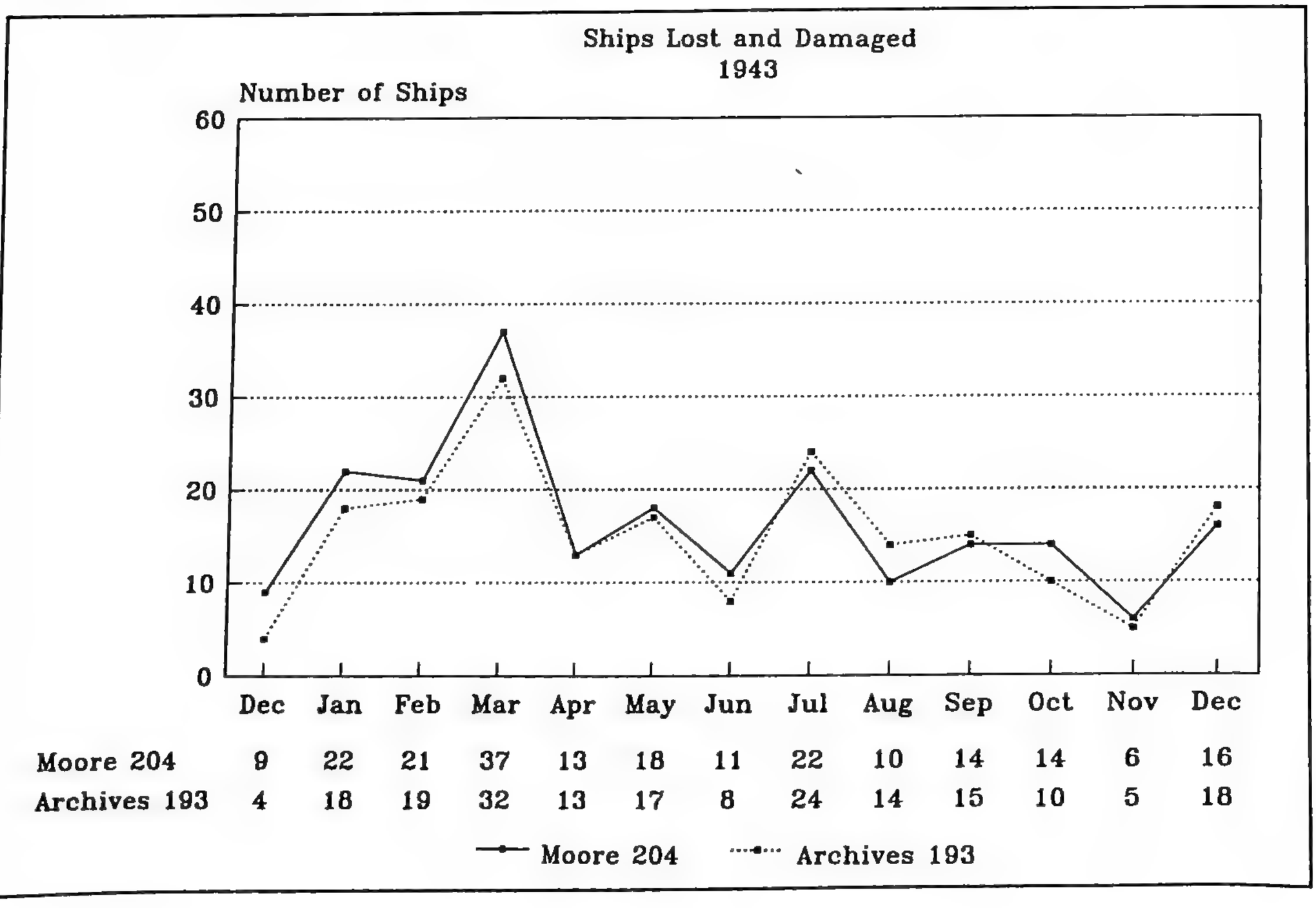

Ships Lost and Damaged
1942
Number of Ships
60
50
40
30
20
10
0
Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Moore 393 14 18 30 35 42 52 56 48 17 22 24 20 9
Archives 378 13 10 24 35 42 56 55 48 19 22 24 20 4
Moore 393
Archives 378
Both totals include six ships sunk prior to December 1941.


Ships Lost and Damaged
1943
Number of Ships
60
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Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
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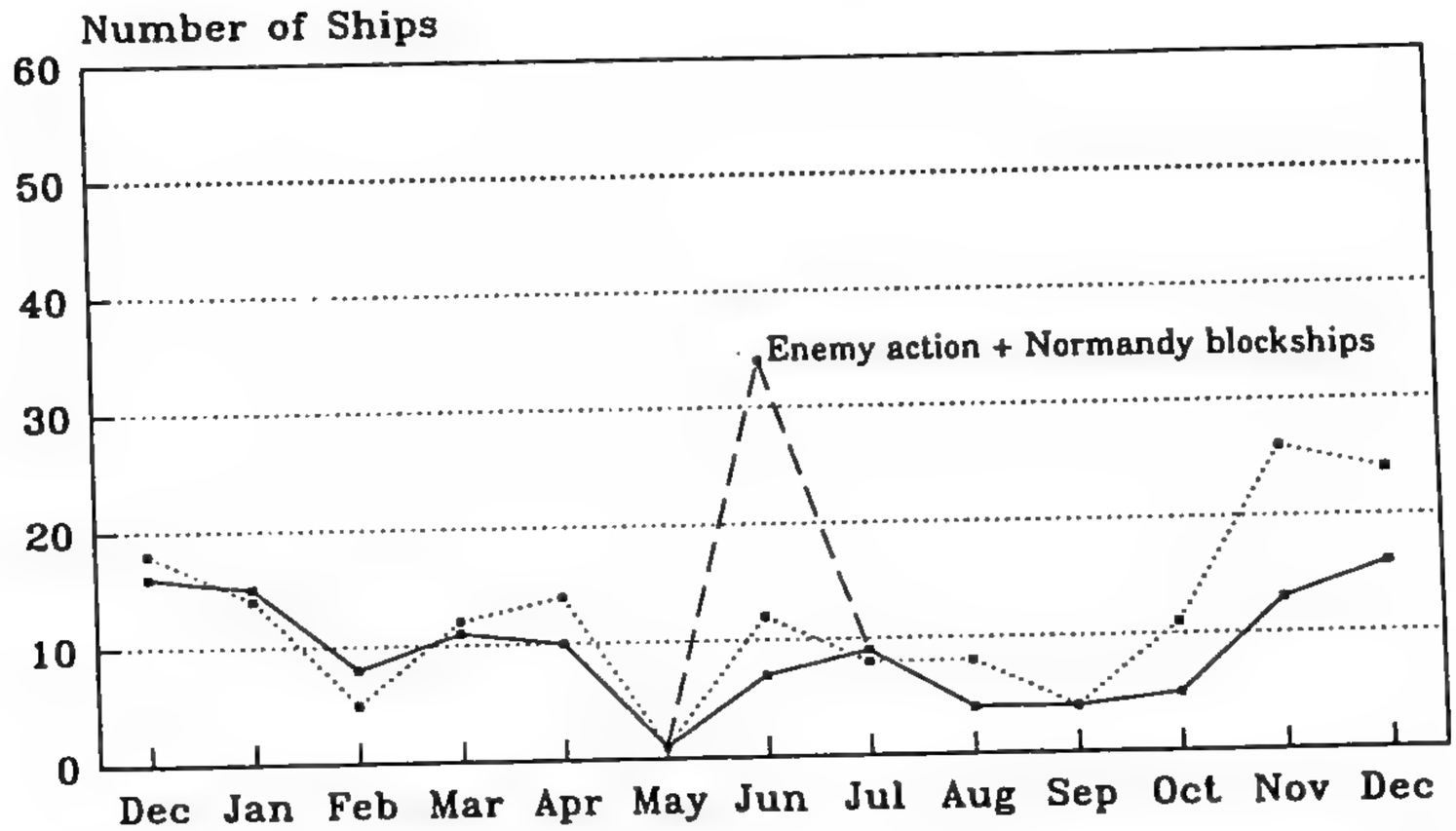
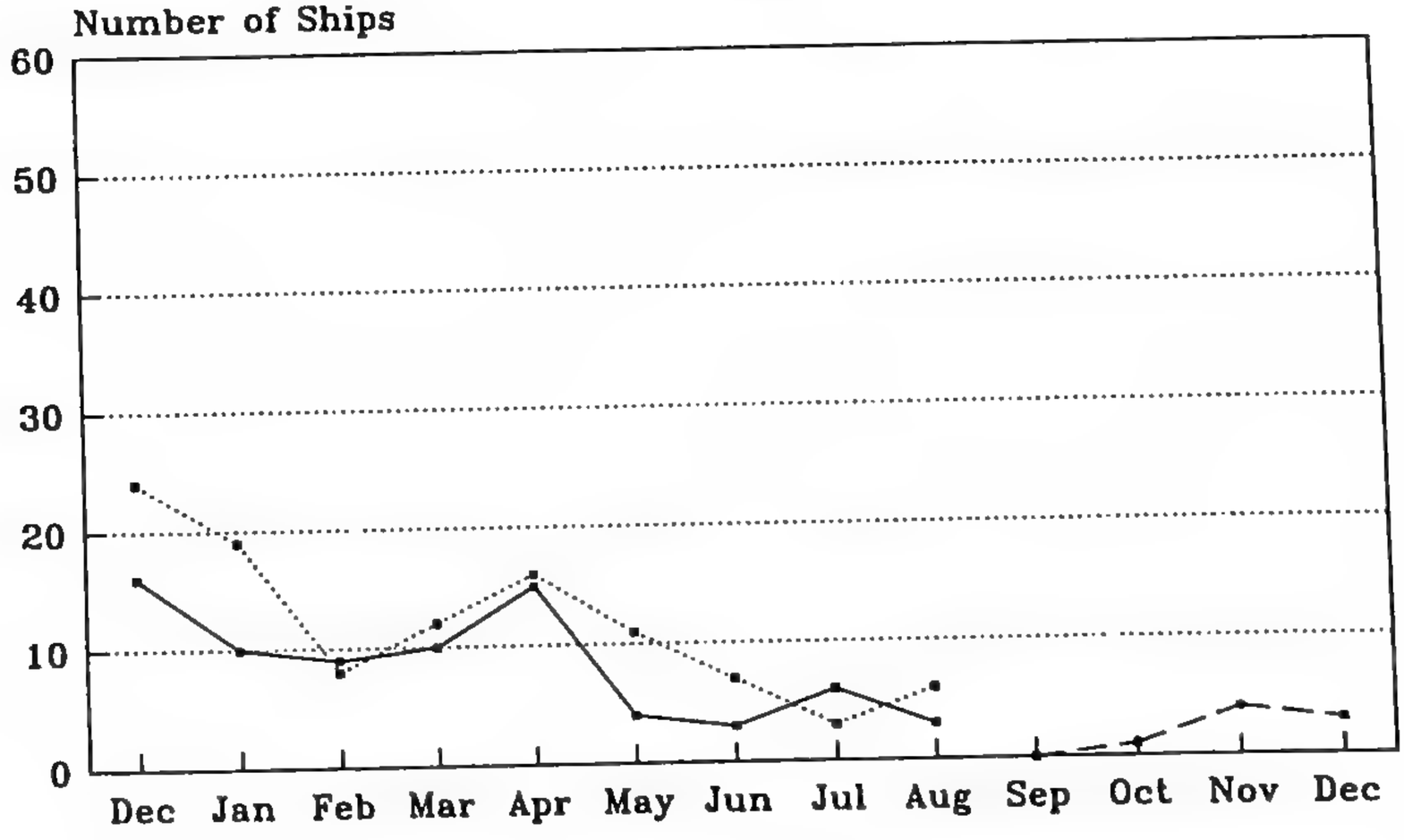
Archives 193 4 18 19 32 13 17 8 24 14 15 10 5 18
Moore 204
Archives 193

Ships Lost and Damaged
1944



*includes Normandy blockships

Ships Lost and Damaged
1945



*up to August 1945

"For The Purposes of Defense": Thomas Jefferson's Naval Militia

GENE A. SMITH

The American military experience in the twentieth century has produced a mentality reflecting the belief that defensive preparedness can be achieved only by offensive capacity. This is not a view unique to this nation or this century. Hermocrates of Syracuse, fearing an Athenian naval expedition against his city in 413 B.C., advocated a similar policy. Naval historian Alfred Thayer Mahan, more than two thousand years later, made this view universal. When Mahan exclaimed that "every war must be aggressive" or the enemy will not "yield to your contention," he laid the foundations for what we have accepted as military policy. This is a view easily understood in an age of mechanized war, nuclear weapons, and high technology quick-strike capability, but the Jeffersonian era was not such an age.[1]

During Thomas Jefferson's years as president, 1801-1809, the United States was predominantly an agricultural nation, focused on internal concerns. It was a country preoccupied with preserving its independence and protecting its own territorial integrity from the uncertainties of a world at war. Furthermore, geography was more important than machines or weapons during the period; thus, national defense meant protecting the nation against invasion rather than the modern concept of the offensive defense.

The Jeffersonian response to the country's security needs was the defense-oriented gunboat program. Gunboats were not large, heavily armed seagoing vessels, but rather small and designed for coastal and harbor protection. They had several common characteristics despite wide variations in their design. They were generally forty to eighty feet long, fifteen to twenty feet across the beam, four to seven feet in the hold, and usually armed with one or two long 24- or 32-pound cannon, plus assorted smaller guns. They were one- or two-masted, shallow-draft vessels designed to maneuver and fight in coastal waters and were considered defensive rather than offensive craft.[2]

Upon assuming the presidency, Jefferson was caught between the desire for national security and an overwhelming need for further reductions in government spending. These were conflicting goals, especially since the Republicans inherited an $82,000,000 debt, or "moral canker," from the outgoing Federalists. As president, Jefferson wanted a naval program that satisfied Republican fiscal concerns and prejudices concerning a permanent military establishment, but more importantly one that he believed provided national security. He believed that a naval militia plan to supplement the gunboat program was a partial solution to the naval and economic problems. Jefferson soon learned, however, that it was impossible to satisfy all concerns because congressional ideology regarding defense needs constantly changed as domestic and international events warranted. He also learned that economic concerns were secondary to national security in times of trouble.[3]

Jefferson's attitude towards the navy has certainly been misinterpreted when compared to the pro-navy ideas of the John Adams administration. The marked contrast in naval ideology has led many to believe that, because of

1. Alfred Thayer Mahan, *The Influence of Sea Power Upon History, 1660-1783* (privately printed, 1890; reprint ed. New York: Sagamore Press, Inc., 1957), 3n. Hermocrates supported a policy of an offensive defense by attacking the Athenian flank as it advanced on the city of Syracuse. See also Mahan, *Sea Power in Its Relations to the War of 1812*, 2 vols. (1905; reprint New York: Haskell House Publishers, Ltd., 1969), 1: 295.

2. Howard I. Chapelle, *History of the American Sailing Navy* (New York: Bonanza Books, 1949), 179-241; Craig Symonds, *Navalists and Antinavalists; The Naval Policy Debate in the United States, 1785-1827* (Newark: University of Delaware Press, 1980), 105-130; Gene A. Smith, "The Ruinous Folly of a Navy: A History of the Jeffersonian Gunboat Program" (Ph.D. diss., Auburn University, 1991), 154-196.

3. Alexander Balinky, "Albert Gallatin, Naval Foe," *Pennsylvania Magazine of History and Biography* 82 (1958): 293; "A Statistical Table for the United States of America, for a Succession of Years," October 1803, Jefferson Manuscripts, Library of Congress [hereafter Jefferson MSS, LC]. This table indicates that the country's expenditures rose from $8,740,329 in 1796 to $12,945,455 in 1801.

Jefferson's affinity for gunboats manned by a naval militia, the navy "had always been . . . his abhorrence." That was not the case; he did not oppose a navy in principle, nor did he intend to eliminate the fleet or replace it with gunboats, especially since it was such an important aspect of national defense. Had Jefferson opposed the navy and been obstinate about its elimination, he would not have sent four consecutive squadrons to the Mediterranean to face the Barbary pirates and restore American honor.[4]

The navy Jefferson wanted, however, was not the same one his predecessor had created. In an attempt to secure command of the sea and a balance of sea power, Adams and the Federalists created the Navy Department and a fleet much larger than Republicans expected or wanted. Yet on 3 March 1801, the day before Jefferson's inauguration as president, the Federalist lame-duck Congress passed an act "Providing for the Naval Peace Establishment." Fearing the even steamer measures the new Republican administration might propose, the Federalist majority preserved the fleet on the statute books while discharging all but forty-five officers and selling more than twenty vessels. In reality, the Federalists actually began what anti-Jeffersonians and pro-navy supporters blamed on the Republicans. It is true that the rationale given by Federalists for the passage of the naval reduction bill was the fear that Republicans would totally disband the navy. That fear was unfounded because Jefferson had no intention of eliminating the fleet or of converting it, as many have maintained, to a "white-water" or "gunboat navy."[5]

Jefferson's navy stressed defense, but it emphasized passive coastal defense rather than controlling the seas to protect trade. Jefferson wanted a modest blue-water force to complement coastal fortifications, gunboats, and other defensive works because he understood that war, as the "greatest scourge of mankind," could never be eliminated and that national leaders must bolster a country's defense to preserve the freedom and the security of its citizens. Jefferson wrote that "our policy and purpose is to provide for defense by all those means to which our resources are competent."[6]

The gunboat program had perceived economic benefits that strongly appealed to Jefferson, Republican congressmen, and a nation whose resources were meager. This was especially true since reducing the national debt was seen as an integral part of the country's survival. Jefferson considered the "fortunes of our republic as depending, in an eminent degree, on the extinguishment of the public debt." In other words, he wanted to reduce the debt because of his personal situation and his observations in debt-ridden Virginia. He also understood that Britain's financial problems helped produce the American Revolution and that similar woes in France spawned the French Revolution.[7]

Should the United States not settle her fiscal problems, Jefferson feared the country would be "committed to the English career of debt, corruption and rottenness, closing with revolution." This disconcerted him, because revolutions always produced "a host of admirals, generals and other officers . . . having more pride than property," who drained the country's resources or overthrew its government. Even after wars or revolutions ended, the expenditures continued, prompting Nathaniel Macon of North Carolina to proclaim, "the war of killing prepares the way for a war of taxes, which never ends." Jefferson realized that a gunboat program supplemented by a naval militia did not end the war of taxes, but he believed it

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4. John T. Morse, *Thomas Jefferson* (Boston: Houghton Mifflin Company, 1898), 259; Chapelle, *History of the American Sailing Navy*, 181; Harold and Margaret Sprout, *The Rise of American Naval Power* (Princeton: Princeton University Press, 1946), 58-61; Forrest McDonald, *The Presidency of Thomas Jefferson* (Lawrence, KS: University of Kansas Press, 1976), 44; William M. Fowler, Jr., *Jack Tars and Commodores* (Boston: Houghton Mifflin Company, 1984), 145; Jefferson to John Adams, 27 May 1813, in Andrew A. Lipscomb and Albert Ellery Bergh, *The Writings of Thomas Jefferson*, 20 vols. (Washington: The Thomas Jefferson Memorial Association, 1904), 13: 249; J. G. de Roulhac Hamilton, "The Pacificism of Thomas Jefferson," *Virginia Quarterly Review* 31 (1955): 616; Julia H. Macleod, "Jefferson and the Navy: A Defense," *Huntington Library Quarterly* 8 (1944-1945): 169-170; Smith, "The Ruinous Folly of a Navy," 14-50.

5. Frederic H. Hayes, "John Adams and American Sea Power," *The American Neptune* 25 (January 1965): 42; Robert F. Jones, "The Naval Thought and Policy of Benjamin Stoddert, First Secretary of the Navy, 1798-1801," *The American Neptune* 24 (January 1964): 61-62; Macleod, "Jefferson and the Navy," 159-160; Walter Millis, *Arms and Men* (New York: G. P. Putnam's Sons, 1956), 56; Russell F. Weigley, *The American Way of War* (Bloomington, IN: Indiana University Press, 1973), 43-44; David M. Cooney, *A Chronology of the U.S. Navy: 1775-1965* (New York: Franklin Watts Inc., 1965), 24; Christopher McKee, *A Gentlemanly and Honorable Profession: The Creation of the U.S. Naval Officer Corps, 1794-1815* (Annapolis: Naval Institute Press, 1991), 36-37. The act provided for nine captains and thirty-six lieutenants, but it did not provide any limit on master-commandants; Charles Oscar Paullin, *Paullin's History of Naval Administrations, 1775-1911* (Annapolis: Naval Institute Press, 1968), 128; *Public Statutes at Large of the United States*, vol. 2 (Boston: Charles C. Little and James Brown, 1845), 110-111.

6. Mary P. Adams, "Jefferson's Military Policy With Special Reference to the Frontier: 1805-1809," (Ph.D. diss., University of Virginia, 1958), iii; Jefferson to Mr. [James] Bowdoin, 10 August 1806, Jefferson MSS, LC.

7. Jefferson to Albert Gallatin, 11 October 1809, Paul Leicester Ford, *The Writings of Jefferson*, 10 vols. (New York: G.P. Putnam's Sons, 1899), 9: 264; Dumas Malone, *Jefferson the President: Second Term, 1805-1809* (Boston: Little, Brown and Company, 1974), 494.

Robert Smith, who served as secretary of the navy from 1802 to 1809, expressed concern about Jefferson's naval militia proposal. Photo courtesy of the Naval Historical Center, Washington, D.C.

would lessen the drain on the nation's resources. That idea strongly appealed to Republican ideology.[8]

Secretary of the Treasury Albert Gallatin agreed with Jefferson's assessments and regarded the navy as the prime candidate for budgetary cuts. He argued that a navy was unnecessary because "the bravery of the mass of the people" was sufficient to repel any invader. During the last year of the Adams administration, naval appropriations totaled almost $3.5 million, due primarily to an undeclared naval war with France. Gallatin proposed to allot less than $2 million to the army and navy together, and in 1802 the navy received only $946,213.24. Both Jefferson and Gallatin opposed a navy that "by its own expenses and the eternal wars in which it will implicate us, will grind us with public burthens, and sink us under them." The country could, Jefferson believed, make large savings by reducing the navy and do so without sacrificing national security.[9]

Jefferson reconciled the differences between economy and defense through the gunboat program. Admittedly, the Jefferson administration built gunboats primarily for defensive reasons, but they also had economic qualities that strongly appealed to Republicans. Gunboats were cheap to build, while navies were inherently expensive. The cost of building a gunboat was originally estimated at about $5,000, an extremely attractive figure when compared to the frigate *Constitution*, which cost $302,718.84, or the brig *Syren*, which cost $32,521.77. Jefferson eventually realized that the price of gunboats was more than their original estimate, but by the time this discovery came to light, Republicans were blinded by the perceived short-term fiscal advantages of the diminutive vessels.[10]

Gunboats had several other economic advantages, according to Jefferson. Navies were not only expensive to construct but even more costly to maintain. Secretary of the Navy Robert Smith confirmed Jefferson's suspicions about the costs of a navy when he reported that the *Constitution*'s annual upkeep was $113,618.25 and the *Syren*'s $41,880.20. This contributed to Jefferson's belief that "a navy is a very expensive engine. [As such] a nation who could count on twelve or fifteen years of peace, would gain by burning its navy and building a new one in time." Jefferson realized that for the United States "to aim at such a navy as the greater nations of Europe possess, would be a foolish and wicked waste of the energies of our countrymen." Moreover, he contended, "it would be to pull on our heads that load of military expence [*sic*], which makes the European labourer go supperless to bed, and moisten his bread with the sweat of his brow." Implementing the gunboat program theoretically lessened naval expenditures, since the vessels could be taken out of commission and manned by a naval militia that would

8. Jefferson to Albert Gallatin, 11 October 1809, Ford, *The Writings of Jefferson* 9: 264; Walter Jones to William Brent, 18 January 1810, Walter Jones Papers, Virginia Historical Society, Richmond; Nathaniel Macon to Joseph H. Nicholson, 31 January 1806, Joseph H. Nicholson Manuscripts, Library of Congress.

9. Malone, *Jefferson the President: Second Term*, 494; Sprout and Sprout, *The Rise of American Naval Power*, 45, 54; Balinky, "Albert Gallatin, Naval Foe," 300-301; Jefferson to the House of Representatives, 18 February 1806, Walter Lowrie and Walter S. Franklin, *The American State Papers: Naval Affairs, March 3, 1789-March 5, 1825* (Washington, D. C.: Gales and Seaton, 1834), 149 [hereafter cited as *ASP*]; Jefferson to Elbridge Gerry, 26 January 1799, Ford, *The Writings of Jefferson* 7: 328.

10. Memo from Robert Smith to Jefferson, 22 November 1804, Jefferson MSS, LC. A rough estimate for the construction of a gunboat was between $5,000 and $6,000; Jefferson to the House of Representatives, 18 February 1806, *ASP*, 149; Robert Smith to Thomas Jefferson, 19 January 1803, Jefferson MSS, LC. Smith estimated that a 16-gun ship would cost $24,000; Paul Hamilton to Richard Cutts, 9 June 1809, *ASP*, 200. Hamilton exclaimed that a gunboat carrying two guns cost $12,000, whereas those carrying one gun cost $9,000.

spring to arms at the sight of enemy sails. They could also be placed in ordinary or laid up out of service under small sheds when not in use.[11]

The gunboat program also satisfied domestic concerns. Jefferson knew that the rabidly anti-navy Republican Congress did not support seagoing vessels but embraced gunboats as an alternative for maintaining the country's security. Because Jefferson was the leader of the Republican party, therefore, he has been accused of making the navy dependent on gunboats. Historian Dumas Malone claims that, despite Jefferson's leadership of his party, he could not overcome congressional opposition to a seagoing navy. Therefore, he reconciled the problem in the only way Congress would approve — the gunboat program. Thus, the program was a well-formulated plan, especially considering the obstacles Jefferson faced. The gunboat program, using a naval militia, meshed with Republican principles and coincided well with the needs of the country.[12]

Jefferson admired both land and naval militias. The virtuous citizen soldiers of the Revolution, which Republicans revered, had sprung to arms to ready the country for war. But their appeal was more deeply seated than their heroic legacy; they fulfilled a dual role. Republicans viewed the militia as a cheap and reliable method of preparing for national defense, while it was also a way to eliminate despotism or "that scourge of civilization, that curse of Liberty, a permanent Military Establishment, which have, and ever will, . . . annihilate every free government."[13]

Jefferson's first inaugural address echoed his firm belief in citizen soldiers and stated that their participation had made the American government the strongest in the world. Furthermore, "a well disciplined militia" was "our best reliance in peace and for the first moments of war." He followed up six months later in his annual message by reminding Congress that a militia was "the only force which can be ready at every point and competent to oppose" an enemy invasion. While there were many inherent problems with a militia, such as local versus federal control, Jefferson still regarded the reserve as the best defense that the nation could possess.[14]

Jefferson's naval reserve was part of an overall militia system and a natural extension of the gunboat program. Since gunboats were to be housed in sheds until times of emergency, why should they not be manned by a naval militia which would also heed the call to arms in times of trouble? Jefferson believed that the United States should possess such a system, and during the fall of 1805 he presented Congress with a plan organizing the country's able-bodied men into units to be distributed throughout the nation's seaports.

The inefficiency of the country's militia provided the rationale for Jefferson's plan. In February 1805, he reported to Congress that the nation's militia was shockingly inadequate because it lacked training, organization, and in many instances even weapons. This inadequacy prompted Massachusetts Congressman Fisher Ames to remark that the country's reserves could easily be defeated by "the Marmalukes [*sic*] or even the cooks of the world's Emperor" and convinced Jefferson to begin the task of reorganizing the country's militia.[15]

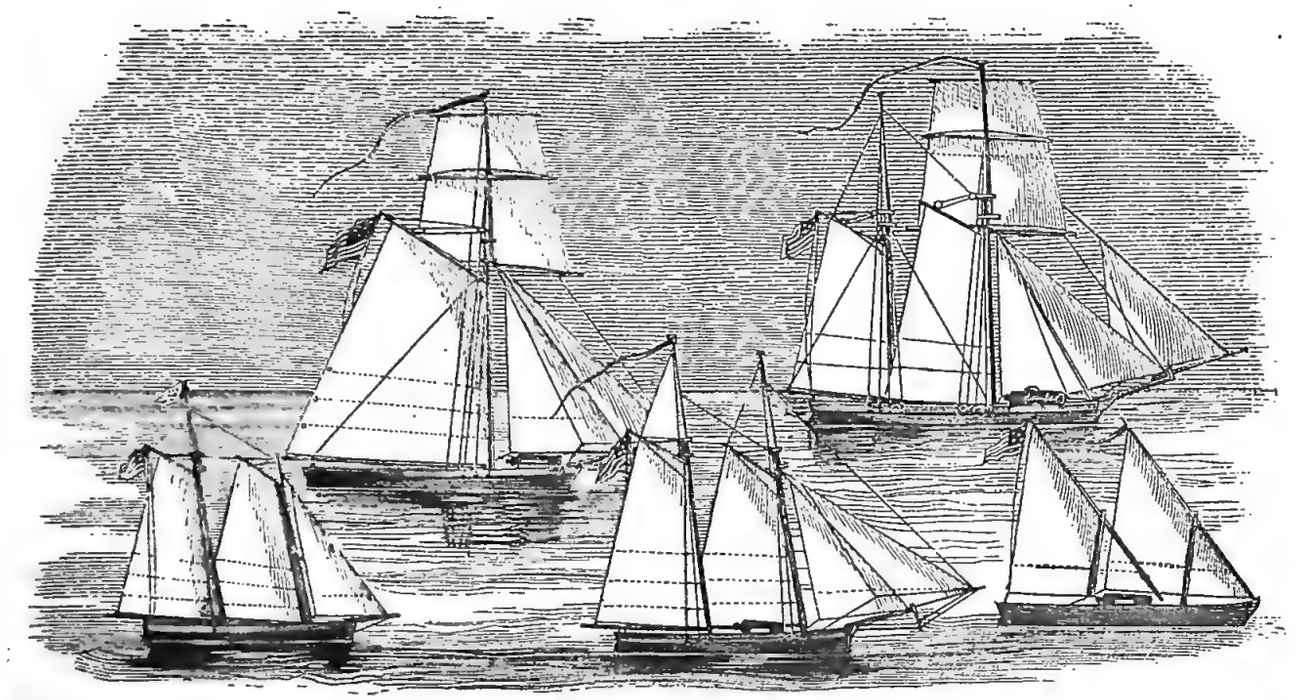
11. Robert Smith to Nathaniel Macon, 27 January 1806, *ASP*, 148; Jefferson to John Adams, 1 November 1822, cited in Leonard D. White, *The Jeffersonians* (New York: The Macmillan Company, 1951), 266; Thomas Jefferson, *Notes on the State of Virginia* (Philadelphia: Prichard and Hall, 1788), 187; Jefferson to Albert Gallatin, 9 February 1807, Albert Gallatin Papers, New-York Historical Society, New York.

12. Mary P. Adams, "Jefferson's Military Policy," 309-313. This work expounds the thesis that Jefferson was extremely concemed with national defense and took measures to ensure it. The author concurs that gunboats were only a part of his defense policy. Jefferson to the Senate and House, "Special Message on Gun-Boats," 10 February 1807, James D. Richardson, ed., *A Compilation of the Messages and Papers of the Presidents, 1789-1897*, 10 vols. (Washington, D. C.: Government Printing Office, 1896), 1: 407-409 (hereafter *Messages of the Presidents)*. In this message, Jefferson reveals that his strategy for defense was a multifarious plan, consisting of more than just gunboats. Malone, *Jefferson the President: Second Term*, 496; Macleod, "Jefferson and the Navy," 153; Paolo E. Coletta, *The American Naval Heritage in Brief*, 2d ed. (Washington, D.C.: University Press of America, 1980), 94. Frederick C. Leiner, in "The 'Whimsical Phylosophic President' and his Gunboats," *The American Neptune* 43 (1983): 245, remarks that Jefferson's naval policy (gunboats) "undermined United States foreign policy, wreaked havoc in the economy, and nearly brought insurrection." The debates over gunboats and national defense in Congress during Jefferson's administration served as a classic example of American democracy, ultimately strengthening the republic's cherished principles.

13. Jefferson to Thomas Mann Randolph, 11 December 1791, Jefferson Papers, University of Virginia; James Kirby Martin and Mark Edward Lender, *A Respectable Army, The Military Origins of the Republic, 1763-1789* (Arlington Heights, IL: Harlan Davidson, Inc., 1982), 207-208; Merrill Peterson, *Thomas Jefferson and the New Nation* (London: Oxford University Press, 1970), 689, 833; Joseph Bartlett, "An Oration Delivered at Biddleford, 4 July 1805," *Early American Imprints*, series 2, no. 7956 (Saco, Maine: William Weeks, 1805), 12-13; Robert W. Tucker and David C. Hendrickson, *Empire of Liberty, The Statecraft of Thomas Jefferson* (New York: Oxford University Press, 1990), 41-42.

14. Jefferson's First Inaugural Address, 4 March 1801, Richardson, *Messages of the Presidents* 1: 309-312; Jefferson's First Annual Message, 8 December 1801, ibid. 1: 314-320; Arthur M. Schlesinger, Jr., ed., *History of American Presidential Elections, 1789-1968*, 4 vols. (New York: Chelsea House Publishers and McGraw-Hill Book Company, 1971), 1: 172; Malone, *Jefferson the President: Second Term*, 512; Theodore J. Crackel, *Mr. Jefferson's Army, Political and Social Reform of the Military Establishment, 1801-1809* (New York: New York University Press, 1987), 6-8.

15. Jefferson to the Senate and House of Representatives, 28



GUN-BOATS.

Gunboats such as these depicted in Benson J. Lossing's *Pictorial Field Book of the War of 1812* (New York: Harper and Brothers, 1869) were to be a primary component of Jefferson's naval defense plan. Photo courtesy of the Naval Historical Center.

The origin of Jefferson's ideas about a naval militia is unclear. He apparently knew of a French plan to establish a "marine militia" or coast guard as early as 1787, and at that time he suggested to John Jay that it might "become interesting to us." In May 1798, the United States government ordered construction of several galleys to be crewed by a "naval militia organized by the army." Perhaps these proposals convinced Jefferson to consider a similar plan, but the opportunity did not present itself until after the gunboat program began. Jefferson credited the general militia reclassification plan, of which the naval reserve was part, to Napoleon Bonaparte. He maintained that Bonaparte had conscripted the services of the young, healthy, and enthusiastic to conquer the Old World, and should Congress not adopt a similar plan, the French would soon conquer the New World too. This was a real threat because French armies had not suffered any serious continental setbacks by 1805, and news of the French and Spanish fleet's destruction in October at Trafalgar had not yet reached the United States.[16]

Jefferson contacted Navy Secretary Robert Smith and Secretary of War Henry Dearborn in late October 1805 to discuss plans for "a regular naval militia to be comprised of all our seafaring citizens." This defense, Jefferson believed, allowed the country "to man a fleet speedily by supplying voluntary enlistments" rather than relying on permanent garrisons. Even though his plan appeared to be simple, it was rather complicated and smacked of governmental bureaucracy and organization, contrary to the Republican ideology of local control.[17]

Jefferson believed that implementing his plan would result in 50,000 eligible men being mustered into the naval militia. He believed this number conservative because it

February 1805, Richardson, *Messages of the Presidents* 1: 366; Peterson, *Thomas Jefferson and the New Nation*, 833; Fisher Ames to Josiah Quincy, 12 February 1806, Josiah Quincy Manuscripts, Library of Congress.

16. Jefferson to John Jay, 9 January 1787, Julian P. Boyd, ed., *The Papers of Thomas Jefferson*, 25 vols. (Princeton: Princeton University Press, 1955), 11: 31; William S. Dudley, ed., *The Naval War of 1812: A Documentary History*, 2 vols. (Washington, D. C.: Government Printing Office, 1985), 1: xlvii; Jefferson to Barnabas Bidwell, 5 July 1806, Lipscomb and Bergh, *The Writings of Thomas Jefferson* 11: 116.

17. Jefferson to Secretary of the Navy, 24 October 1805, Jefferson MSS, LC.

reflected the 1803 tonnage returns for whale and cod fisheries and for foreign and coastal trade, which totaled 917,054 tons. Normally, Jefferson claimed, we "employ . . . six men to every 100 tons" of commerce, but since all men were not of military age nor free white citizens, "5 [men] to the 100 tons" was an accurate estimation. Even so, this provided less than 46,000 men for the naval militia. The additional men needed to fulfill the 50,000 projected quota would come from "the seamen then in our navy, and those employed on the tide-waters within the United States." By using these additional forces, Jefferson believed that "we may safely state" that the naval militia would total 50,000 men.[18]

The naval militia plan required that "every free, able-bodied, white male citizen" between the ages of eighteen and forty-five whose "principal occupation" was on the seas or tidewaters be subject to the naval militia. They were to report to nearby towns, ports, or harbors, be formed into companies commanded by state-appointed authorities, and train with artillery and gunboats or other armed vessels at least once every two months.[19]

The naval militia was separate from the land reserve; therefore, those who served in it were not subject to concurrent duty in both. They were, however, still required to abide by all the rules and regulations of the land reserve. If a naval militiaman disobeyed or failed to carry out his duties, he was "liable to the same pains, penalties, and coercions, and to trial by a court-martial." Should an individual refuse to serve, or even "delay to enter on duty," he would be arrested as a deserter and punished or be "compelled to perform his tour of duty." As with the land militia, a person could commute his service by finding a suitable substitute.[20]

The duty of the naval militia was to protect the government from attack, by either domestic or foreign enemies. "In cases of insurrection, [or] of opposition to the civil authority," they were to report to their stations "to do duty with artillery on board any armed vessels" to quell the uprising or to enforce the existing laws. Should the country be invaded, all militiamen under age thirty-five were to report immediately to their stations to serve a one-year term aboard any warship within the vicinity.[21]

18. Notes from Jefferson to Albert Gallatin on "A Bill for Establishing a Naval Militia," December 1805, Jefferson Papers, New-York Historical Society, New York.

19. Ibid.; Lawrence Delbert Cress, *Citizens in Arms, The Army and the Militia in American Society to the War of 1812* (Chapel Hill, NC: University of North Carolina Press, 1982), 166.

20. Notes from Jefferson to Albert Gallatin on "A Bill for Establishing a Naval Militia," December 1805, Jefferson Papers, New-York Historical Society, New York.

21. Ibid.

Robert Smith warned Jefferson that his naval militia plan had numerous flaws. The major problem, according to the secretary, was that the naval militia would ultimately be under federal rather than state authority because the president appointed commanding officers of U.S. naval vessels. The plan stipulated that the militia be commanded by a lieutenant-commandant and a second lieutenant appointed by the state rather than the federal government. Smith also reminded the president that a naval militia officer was inadequately prepared for sea duty because naval officers needed "five or six" years of training before they assumed command of a public armed vessel. Captain Thomas Truxtun supported Smith's assertion, remarking "that a seaman will make a soldier in the field immediately . . . but a soldier or other citizen cannot make a seaman, but from long experience and actual service." Moreover, Smith argued that the naval militia would be required to perform duties "beyond the limits of the United States," contrary to "the laws of the Union." The secretary concluded by informing Jefferson that the proposal as stated, "provides for *training* the naval militia," rather than describing the training which should be "under the authority of the states." This, he accurately predicted, would cause the plan's defeat.[22]

In contrast, Dearborn's report suggested changes in the way the system operated rather than dwelling on questions of legality. The secretary of war believed the militia should meet only four days a year instead of every two months. He also contended that if a person missed a muster, regardless of the reason, he should be subjected to a fine. If he failed to provide a suitable substitute, he should be subjected to a fine and held in custody until it was paid. Furthermore, due to the perpetual problem of logistics, Dearborn suggested that the secretary of the navy provide each unit with two or more artillery pieces complete with ammunition in case gunboats or other armed vessels were unavailable. This, he argued, allowed training without direct governmental intervention.[23]

The House referred the naval militia, as part of Jefferson's overall reclassification plan, to a select committee headed by staunch Republican Joseph B. Varnum of Massachusetts. While the reorganization included a naval section, the question of a separate naval militia did not surface during debate on the proposal. The more

22. Robert Smith to Jefferson, 14 November 1805, Jefferson MSS, LC; Thom M. Armstrong, *Politics, Diplomacy and Intrigue in the Early Republic, The Cabinet Career of Robert Smith, 1801-1811* (Dubuque, IA: Kendall/Hunt Publishing Company, 1991), 34; Thomas Truxtun to [?], 18 April 1799, Thomas Truxtun Papers, United States Naval Academy Museum, Annapolis, MD.

23. Henry Dearborn to Jefferson, November 1805, Jefferson MSS, LC.

This illustration shows the typical uniform of a sailor of the War of 1812 period. Photo courtesy of the Naval Historical Center.

pertinent question of a land reserve overshadowed the naval militia proposal. The result was that the committee opposed classification of the militia, and Varnum refused to sponsor the legislation.[24]

When the militia proposal came before the full House on 27 January 1806, Benjamin Tallmadge of Connecticut led the assault by asking if the plan would "add anything to the real defence" of the country. Even though Tallmadge was questioning the efficacy of Jefferson's land militia, perhaps he was also addressing the necessity of a naval militia. Was there a need for a naval militia to supplement an institution that most Republicans felt unnecessary? Tallmadge followed with a prolonged soliloquy before concluding that the reclassified militia "was intended to be a mere paper thing, a formidable force without any real existence."[25]

Massachusetts Federalist Josiah Quincy opposed the plan because of the image it presented. He thought that, should the proposal pass, it would saddle the nation with "a servile degraded spirit" in the eyes of both the people and of foreign nations. He argued that if Congress was going to make overtures toward defense, it should increase the army and navy rather than rely on Jefferson's plan for the militia. Otherwise, the militia reclassification would give a detrimental impression at a time when the people were looking for leadership from Congress. In any case, Jefferson's hopes for naval militia were not borne out in the House.[26]

Samuel Smith of Maryland, brother of the secretary of the navy, introduced a similar bill in the Senate on 22 January 1806. The Senate version suffered the same fate as its House counterpart, but by a more than two-to-one margin (19-8). Throughout the entire episode Jefferson believed that his proposal, perhaps with minor changes, would pass, and should it be adopted, the United States "need never raise a regular [force] *in expectation of war.*"[27]

Republican congressmen opposed Jefferson's militia plan because they were unwilling to bring more organization and federal control to an entity that was supposedly state-oriented. They were also unwilling to pass certain provisions within an act simply because it was a pet project of the president. Congress's rejection of Jefferson's plan to dry-dock the nation's frigates during the winter of 1802-1803 had proven that point. The naval militia could have been a valuable asset to the country, especially after the congressional act of 21 April 1806, which stipulated that the "whole number of able seamen, seamen, and boys, shall not exceed nine hundred and twenty-five" for the entire fleet, including gunboats. Even though the act limited the number of seamen, it did authorize thirteen

24. *Annals of Congress*, 9th Cong., 1st sess., 2 January 1806, 327-330; Crackel, *Mr. Jefferson's Army*, 162-163; Richard Alton Emey, *The Public Life of Henry Dearborn* (New York: Arno Press, 1979), 157-158; Malone, *Jefferson the President; Second Term*, 513-514; Cress, *Citizens in Arms*, 167-168.

25. *Annals of Congress*, 9th Cong., 1st sess., 27 January 1806, 398-401.

26. Ibid., 403-405; Malone, *Jefferson the President: Second Term*, 513-514.

27. *Annals of Congress*, 9th Cong., 1st sess., 22 January 1806, 69-70 and 25 February 1806, 141; Malone, *Jefferson the President: Second Term*, 513-514; Jefferson to Henry Dearborn, 31 December 1805; Jefferson to William Burwell, 15 January 1806, Jefferson MSS, LC.

captains, nine master-commandants, 72 lieutenants, and 150 midshipmen, providing the secretary with much-needed officers. Still, Jefferson and Smith found that this legislation placed severe limitations on their ability to run the Navy Department efficiently.[28]

The failure of the naval militia proposal left Smith's department with a serious manpower shortage. The secretary reported to Jefferson in January 1807 that the country had about 700 seamen in actual service, not including the 412 men needed to outfit the frigates *Chesapeake* and *Wasp*. Furthermore, the naval commander at New Orleans, John Shaw, had enlisted 400 additional seamen just for the defense of that city. Smith was struggling to run the Navy Department efficiently, but now it was impossible to man the country's vessels without violating federal law. Fortunately for Smith, Congress recognized his problems during the spring of 1807 and increased the navy to 1,425 men. Even so, by January 1808 Smith was once again in the same predicament, and he reported to Jefferson that, should all the country's gunboats be manned, each with 24 seamen, and the frigates *Constitution* and *Chesapeake* with a full crew, the department would exceed the 1807 manpower act by more than 1,100 men.[29]

Jefferson's next discussion of a naval militia came with his special gunboat message to Congress in February 1807. In that report he visualized three scenarios for using militia-manned gunboats. The first was when the country was at general peace. Under peaceful conditions, only six or eight gunboats were necessary while the rest were to be placed in ordinary, incurring expenses only for the sheds to protect them and sentinels to ensure that no mischievous damage occurred. The second situation presupposed the continuation of the European wars. If those continued, Jefferson believed that about twenty-five vessels, afloat but with only enough men to navigate and care for the craft, were necessary. The last situation anticipated that the United States would be at war. In this case the number of gunboats needed depended on the "character" of the war itself, but regardless of the number, they were to be brought into action by "relying on the seamen and militia of the port." Jefferson believed the annual expenditures for the navy could be considerably reduced by using these simple criteria and a naval militia. In reality, the president's report was irrelevant because Congress refused to build additional gunboats, and with that decision during the spring of 1807, the subject, including the naval militia, was moot.[30]

During the summer of 1807, when military needs became imperative, Jefferson once again expressed grave concern about the country's lack of defenses and her need for a naval militia. The events surrounding the oft-told story of the HMS *Leopard*'s attack on the USS *Chesapeake* and seizure of American seamen in June 1807 brought the threat of war with Great Britain. Furthermore, it demonstrated that the United States was unable to protect itself or man its naval vessels, even at Norfolk where anti-British sentiments were rampant because of the incident. The president believed that the only remedy for the shortage of seamen was "to erect our sea-faring men into a naval militia and subject them to tours of duty in whatever port they may be." Not surprisingly, the penny-pinching Albert Gallatin estimated later that fall that Jefferson's proposed naval militia would cost about $1.5 million, a hefty amount for Republicans who wanted to eliminate the national debt, though only a trifling sum in terms of security.[31]

Jefferson brought the question of the naval militia before Congress again with his seventh annual message in late October 1807. Gunboats, he said, had already been assigned, in light of the *Chesapeake* disaster, to New York, New Orleans, and the Chesapeake Bay. But the country needed more craft, and "for manning these vessels in sudden attacks," the nation's seamen should be formed into a "special militia." This unit, Jefferson contended, would "be called on for tours of duty in defense of the harbors" and work in combination with the land militia to ensure the country's security.[32]

On 16 November 1807, the House referred the naval militia proposal to a select committee chaired by Republican Matthew Clay of Virginia. Jefferson understood the reason for the failure of his proposal in 1806. This time he

28. Tucker and Hendrickson, *Empire of Liberty*, 42; Robert M. Johnstone, Jr., *Jefferson and the Presidency: Leadership in the Young Republic* (Ithaca, NY: Comell University Press, 1978), 153; *Annals of Congress*, 9th Cong., 1st sess., 21 April 1806, 1272-1273; Jefferson to Robert Smith, 22 April 1806, Jefferson MSS, LC.

29. *Annals of Congress*, 10th Cong., 2nd sess., 3 March 1807, 1286-1287; Frank L. Owsley, Jr., "Robert Smith," in Paolo Coletta, ed. *American Secretaries of the Navy*, 2 vols. (Annapolis, MD: Naval Institute Press, 1980), 1: 82; Robert Smith to Jefferson, 13 January 1808, Jefferson MSS, LC.

30. Jefferson to the Senate and House of Representatives, "Special Message on Gun-Boats," 8 February 1807, Richardson, *Messages of the Presidents* 1: 407-409; Symonds, *Navalists and Antinavalists*, 117-118; Secretary of the Navy to John Beekman, 8 January 1805, "Letters Sent by the Secretary of the Navy to Officers Commanding Gunboats," Entry 173, Record Group 45, National Archives, Washington, D. C. (hereafter NA, RG 45); Jefferson to Mr. [Joseph] Nicholson, 29 January 1805, H. A. Washington, *The Writings of Thomas Jefferson*, 8 vols. (Washington, D. C.: Taylor and Maury, 1854), 4: 568.

31. Jefferson to Samuel Smith, 30 July 1807, Lipscomb and Bergh, *The Writings of Thomas Jefferson* 11: 301; "Notes on Consultation, 26 July 1807 to 22 October 1807," Jefferson MSS, LC.

32. Jefferson's Seventh Annual Message, 27 October 1807, Richardson, *Messages of the Presidents* 1: 413-418.

was wise enough to suggest that the reserve would be "confined for the present to *harbor* defense," rather than serve on board seagoing ships. Jefferson believed this would make the "seamen feel less alarm if [they were] restrained for the present to harbor defense" and would ultimately help the bill pass congressional scrutiny. While Jefferson gave the impression that he wanted the unit solely for harbor defense, he believed that an amended bill allowing seamen to serve aboard seagoing vessels would pass if events necessitated. Jefferson optimistically surmised that since the militia reorganization was being proposed "on a better plan," it would have "more probable success."[33]

Poor relations with Great Britain underscored the need for bolstering the nation's defenses and reorganizing the structure of the militia. Jefferson earnestly believed that his reclassification plan fulfilled both concerns while introducing a simpler system. Yet the bill's ultimate fate was that no vote was ever taken, even though Congress debated the proposal extensively. Most congressmen feared a war with Great Britain and instead chose to enlarge the permanent garrisons.[34]

Traditional arguments against enlarging the standing forces fell upon deaf ears in the wake of the *Chesapeake* disaster. Security and defense needs outweighed economic concerns and the fear that a large standing army would endanger civil liberties. New arguments advocated the necessity of a larger force. Some contended that the nation's growth warranted an increase in its military establishment. Henry Southard of New Jersey typified the change when he asserted that the country needed additional troops to protect not only the Atlantic seaboard against depredations and the western states against the Indian menace, but also the frontier from the designs of the British, the French, the Spanish, or cunning individuals such as Aaron Burr. Arguments such as these held sway as the House approved an increase in the regular standing forces by an almost six-to-one margin (ninety-five to sixteen), thereby finishing the chapter on Jefferson's militia reclassification plan.[35]

While Congress did not choose to implement Jefferson's militia proposal, it did realize the importance of defense and agreed to increase the number of gunboats. The additional vessels placed Jefferson and Smith in a predicament because Congress had limited the navy to 1,425 seamen. The navy secretary reported that 1,277 additional seamen were needed just to put the gunboats into service. Without a naval militia, the administration quickly found that it had to reduce the number of men aboard each gunboat and even discontinue building the craft.[36]

Jefferson ultimately abandoned the naval militia proposal along with the general reclassification plan. While it aimed at enhancing security, satisfying ideology, and ultimately reducing expenditures, it initially did not pass congressional scrutiny because of unified prejudices against "any organization that might smack of a standing army." Later, world events required more drastic actions than revising the militia system. Yet the failure of his plan did not dampen Jefferson's spirit toward militias or toward his defense program. He understood the importance of increasing the military establishment and believed that the enlarged force could be used "for garrisoning our seaports, and forming a nucleus for the militia to gather to."[37]

While there are valid reasons to condemn Jefferson's naval militia proposal as a ludicrous scheme of an impractical idealist, it should be remembered that his original plan called for the militia to be integrated into the country's overall defense system. The naval militia, therefore, was not part of an anti-navy policy, nor a Republican alternative for a permanent military force, nor a way to extinguish the national debt. According to Jefferson, the gunboat program manned by a naval militia was simply "for the purposes of defense."[38]

33. *Annals of Congress*, 10th Cong., 1st sess., 16 November 1807, 903; Jefferson to Samuel Smith, 5 November 1807, and to Robert Smith, 14 January 1808, Jefferson MSS, LC.; Jefferson to William Short, 15 November 1807, Jefferson Papers, Swem Library, College of William and Mary, Williamsburg, Virginia.

34. Malone, *Jefferson the President: Second Term*, 513-515; *Annals of Congress*, 10th Cong., 1st sess., 19 January 1808, 1472-1481, 20 January 1808, 1484-1486, and 26 January 1808, 1509-1511.

35. *Annals of Congress*, 10th Cong., 1st sess., 5 April 1808, 1939-1952, 6 April 1808, 1977-2021, and 7 April 1808, 2062; Emey, *The Public Life of Henry Dearborn*, 228-229.

36. Jefferson to Robert Smith, 14 January 1808, Jefferson MSS, LC; Charles Goldsborough, *The United States Naval Chronicle* (Washington, D. C.: James Wilson, 1824), 336; Secretary of the Navy to William Van Deurson, 12 January 1808, "Gunboat Letters," Entry 173, NA, RG 45.

37. Johnstone, *Jefferson and the Presidency: Leadership in the Young Republic*, 153; Jefferson to Dupont de Nemours, 2 May 1808, Jefferson MSS, LC.

38. Jefferson to the Senate and House of Representatives, "Special Message on Gunboats," 10 February 1807, Richardson, *Messages of the Presidents* 1: 407.

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Sailing and Interpreting the Ships on the Gotland Stones

JOHN LINDOW

The picture stones from the island of Gotland, off Sweden's Baltic coast, are among the most impressive pictorial monuments of the Norse world. Nearly four hundred in number, they date from the Migration Period through the eleventh century and range in size from the so-called "dwarf stones" up to giants nearly two meters in height.[1] Sune Lindquist contributed the standard scholarly treatment, and in that work he distinguished five groups of stones, related to each other in a rough linear chronology.[2] The stones of group A are mostly from the fifth and sixth centuries. In their use of circles and spirals they parallel, and may have been influenced by, Spanish and Portuguese, late Roman, and Frankish mortuary art. Group B stones are mostly from the sixth and seventh centuries, according to Lindquist, and are distinguished partly by their shape; these are the so-called dwarf stones. The stones of group C are from the Viking Age and contain considerably expanded pictorial content. Most of the best-known Gotland picture stones belong to this group; Lärbro Tängelgårda I (L86-88, N189[3]) and Lärbro Stora Hammars I (L81-82, N184) are examples (see figures 1 and 2 on page 40). Group D comprises a small set of stones "post-classical" to those of group C. The pictorial contents are similar, and these stones too are from the Viking Age. Ardre VIII (L139-40, N16), perhaps the best known of all the Gotland picture stones, belongs to this group (see figure 3 on page 41), as does Alskog Tjängvide I (L137-38, N4; see figure 4 on page 42). The stones of group E are from the eleventh century, the age of the runic revival in Sweden. Consequently, these stones frequently combine runic inscriptions with the typical pictorial elements of groups C and D.

Common to all groups is the representation of ships and animals alongside geometric decoration. The Gotland stones therefore offer a chronological record of ships on this Baltic island, and we may note that the sail appears first in group B and only assumes in groups C and later the form we hold to be typical for the Viking Age. These representations of masts, sails, and rigging have been of considerable interest, since the great archaeological boat finds of the Oslo fjord, Roskilde fjord, and elsewhere have typically been laconic or even silent with respect to such details. Typical reconstructions of Viking ships, both those done on paper in scholars' studies and in wood in workshops, have been confident in their details of construction of hull, mast step, and the like, but they have had to turn to subtle argumentation or to ethnography for the rig and sail. The Gotland picture stones offer the preponderance of what Viking Age evidence there is.

One very curious detail has been the complex set of ropes portrayed just below the sail in many of the stones of periods C and D. Earlier reconstructions tended to omit it, perhaps with the understanding that it was, as Harald Åkerlund suggested, merely a means of brailing or reefing the sail — that is, of reducing sail area in heavy wind.[4] Recently, however, an ethnographic association with the *priare* (an arrangement of multiple connected sheets on the foot of the sail) of nineteenth-century Norwegian boats was established,[5] and the imaginative archaeological

1. The traditional date for the earliest of the stones, ca. A.D. 400, may be too late; a possible picture stone can be dated to ca. A.D. 250-300 or even earlier. See Peter Manneke, "En tidig bildsten i Grötlingbo?" *Gotländskt arkiv* 56 (1984): 81-88. Recent surveys of the stones are Erik Nylén, *Bildstenar*, with catalogue by Jan Peder Lamm (Visby: Barry Press, 1978), and Erik Nylén and Jan Peder Lamm, *Bildsteine auf Gotland* (Neumünster: K. Wachholtz, 1981).

2. Sune Lindquist, *Gotlands Bildsteine* (Stockholm: Kungl. Vitterhets historie och antikvitets akademien, 1941-42).

3. To facilitate examination of the stones, at the first mention of each I indicate with the number following L the figure(s) numbered in Lindquist, *Gotlands Bildsteine*, vol. 1, and with the number following N the number of the stone in the catalogue in Nylén and Lamm, *Bildsteine auf Gotland*. Those who compare the photographs of retouched and unretouched stones will realize that just seeing what is on the stones poses a problem in and of itself.

4. Harald Åkerlund, "Áss och beitiáss," *Unda Maris* (1955-56): 73-78.

5. Bernhard Færøyvik and Øystein Færøyvik, *Inshore Craft of Norway*, ed. Arne Emil Christensen (Oslo: Grøndahl, 1979), 18, cited in Seán McGrail, *Ancient Boats in N.W. Europe: The Archaeology of Water Transport to AD 1500* (London and New York: Longman, 1987), 237-238.

Figure 1: Lärbro Tängelgårda I, from Sune Lindquist, *Gotlands Bildsteine* (1941-42), figure 86.

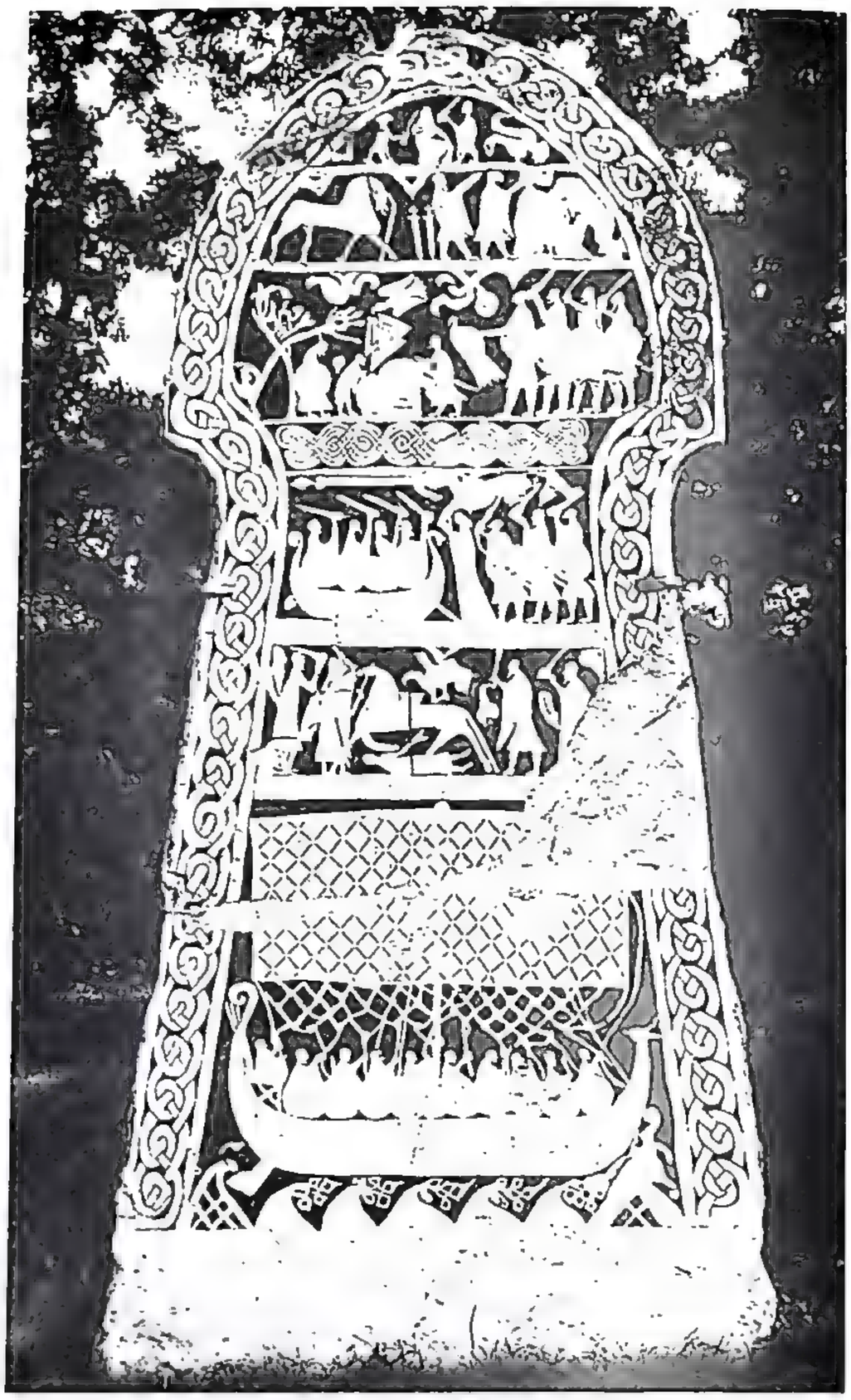

Figure 2: Lärbro Stora Hammars I, from Lindquist, *Gotlands Bildsteine*, figure 81.

reconstruction efforts of the last decade appear to have confirmed this rigging detail as genuine. A curtailed version of it was used on the replica *Odin's Raven*, which sailed from Trondheim to the Isle of Man in 1979, but it had a tall trapezoidal sail quite unlike those on the Gotland picture stones.[6] Another ship, the *Imme Sleipnir*, was built in southern Jutland, Denmark, in the early 1980s and was apparently rigged in accordance with the Gotland stones, especially Lärbro Tängelgårda I, but the experiment has not to my knowledge been published. By far the most noteworthy undertaking in this context is the replica *Krampmacken*.

This vessel was built during 1979-80 by RAGU (an acronynm for Riksantikvariets Gotlandsundersökningar, the project of Gotlandic investigations of the national department of antiquities in Sweden), under the overall direction of the archaeologist Erik Nylén.[7] It is modeled on the ship find from Bulverket in Tingstäde Träsk and on the Gotland picture stones, and it relies exclusively on the

6. Alan Binns, *Viking Voyagers: Then and Now* (London: Heinemann, 1980), 122-130, but cf. n. 30 below.

7. Erik Nylén, "Segla, ro, släpa och dra–skepp till Miklagård: ett preludium," *Gotländskt arkiv* 53 (1981): 21-30; idem, "Med *Krampmacken* över Gotland och Östersjön: seglet prövas," *Gotländskt arkiv* 54 (1982): 29-44; idem, "Das Wikingerschiff im Ostseeraum und die Flusswege gegen Südosten," in *Society and Trade in the Baltic During the Viking Age: Papers of the VIIth Visby Symposium Held at Gotlands Fornsal, Gotland's Historical Museum, Visby, August 15th-19th, 1983*, ed. Sven-Olof Lindquist and Birgitta Radhe (Visby: Gotlands Fomsal, 1985): 251-264; idem, "Med *Krampmacken* i Österled," *Gotländskt arkiv* 58 (1986): 15-22.

Figure 3: Ardre VIII, from Lindquist, *Gotlands Bildsteine*, figure 139.

latter for details of rigging.[8] Like the Tingstäde boat, it is eight meters long and two wide, clinker built with eight planks per side over nine ribs. The sail is mostly woven from the wool of Gotlandic sheep, with linen and hemp added, and Nylén attempted, not fully successfully, to duplicate the interwoven pattern suggested by the stones.

Nylén undertook his experiments with *Krampmacken* in connection with recent findings and theorizing about the role of iron in the economy of pre-Viking Age Sweden. The later eighth century saw a surplus of iron and the beginning of copper mining in the northwest Mälar region. The inshore boats of the period, as attested in the grave finds, were adequate for transporting such metals to the coast, where reloading into seagoing vessels would take place. These Baltic ships might have looked like those on the Gotland picture stones of groups C and D, which in fact date from roughly this period and later, and it is certain that Gotlanders participated in this trade.

Nylén and others[9] have speculated on the importance of this growing iron trade for the rise of the trading town Birka and in the formation of the kingdom of the Svear at the expense of earlier Vendel culture in Uppland during the course of the eighth century. In any case, what is important for the ships is the voyage from the Swedish coast to distant Baltic points and beyond. The raw iron, Nylén believes, could have been transformed by skilled

8. On the Tingstäde boat, see Carl Olof Cederlund, "Bulverketbåten — en modell för dokumentation av båt- och fartygslämningar," *Fornvännen* 75 (1980): 30-43.

9. See, for example, Björn Ambrosiani, "Specialization and Urbanization in the Mälaren Valley — a Question of Maturity," in Lindquist and Radhe, *Society and Trade in the Baltic*, 103-112.

Figure 4: Alskog Tjängvide I, from Lindquist, *Gotlands Bildsteine*, figure 137. The presence of runes and the unusual shape of the sail distinguish this stone from the others.

Gotlandic smiths into semi-finished products — say sword blades — and loaded into specialized Baltic traders that could be sailed, rowed, and portaged over land. These could be taken to one of three river routes. The first, through the Gulf of Finland to Ladoga, Novgorod, and thence south or southeast to the Black Sea, was primarily the route of the Svear, although Gotlanders also used it. The second, through the Duna to Kiev and thence south, and the third, through the Vistula, Bug, and Pripet rivers, and thence down the Dnepr to Kiev, would have been more natural for Gotlanders, and Nylén elected to try the third route with *Krampmacken*. On the first stage, during the summer of 1983, he and a crew of ten transported 140 simulated iron sword blades aboard *Krampmacken*, and through a combination of sailing, rowing, pulling from ashore, pushing from alongside in shallow water, and portaging with wheels and even a terrified horse, they succeeded in traveling from the mouth of the Vistula to Drohiczyn, near the Russian border. At about that point, Nylén theorizes, the dense cargo of iron might have been traded for bulkier furs, and the reduced weight and draft would help the vessel in the rest of the journey. RAGU, however, was up against a different set of difficulties than those faced by early Viking Age merchants. The Soviet officials denied entry to *Krampmacken*. RAGU worked out an alternative route: from the Vistula to the San, then a portage of three hundred kilometers over the Carpathian mountains via the Dukla Pass and down to the Danube. This amazing voyage was carried out in five months of 1985, and *Krampmacken* reached Istanbul in late September of that year. On the first of October the crew visited the Hagia Sofia mosque and symbolically ended their expedition, which was a great media success, near the Viking Age runic inscription on the balustrade there.

The experiments with *Krampmacken*, taken together with the related evidence, dispel all doubt about the realism of the ships portrayed on the Gotland picture stones. Can this help us to interpret the stones?

Although there have been dissenters, such as Karl Helm,[10] many observers have recalled the parallelism of the earliest stones with known mortuary art and therefore have been inclined to regard the ships on the Gotland picture stones as ships of the dead; that is, as iconographic representations of the custom established by archaeology, and to a lesser extent by Old Norse literature and by one famous passage in Arabic literature, of sending the dead off to the other world in boats. There is, however, a certain amount of evidence against this assumption. Erik Moltke asserted that up until ca. 1,000 A.D. the grave was imagined as a place in which people stayed;[11] therefore, a ship in it would probably not have been conceived as a means of transportation to the other world. The boat graves were uncrewed, except for the honored dead and, apparently, an occasional servant, such as the slave on the Oseberg ship or two beheaded males in a boat grave from Uppland excavated in 1974;[12] here one might also note that the Hedeby boat grave had armor for three persons, but no skeletons.[13] The Viking Age tapestry fragment from Rolsvøy on the Oslo fjord, recently interpreted by Erland Johansen as a funeral scene,[14] shows a group of five men and two women, apparently the funeral party, gazing at an empty ship — perhaps, according to Johansen, the funeral ship interred nearby in Tune, which now stands in the Viking Ship Museum in Oslo. The ships on the Gotland stones, on the other hand, are fully crewed.

The only apparent eyewitness account of a Viking Age funeral, that reported by the Arab ambassador Ibn Fadlan concerning a Rus chieftain on the Volga, has the ship up on chocks ashore, where it is burned. Furthermore, the two Norse heroes actually set adrift on ships to get to the other world through wind propulsion, King Haki in the *Ynglinga saga* of Snorri Sturluson's *Heimskringla* and Sigurd Hring in Arngrímur Jónsson's late Latin paraphrase of the lost *Skjöldunga saga,* are cremated aboard the floating vessel.[15] Only Scyld Scefing of *Beowulf* seems to have made the entire journey by boat, and despite the important connections between that Old English poem and southern Scandinavia, the perhaps underestimated evidence for English and Baltic contact and trade in the pre-Viking period and in the Viking Age and Middle Ages,[16] and the occasional claim of British influence on the iconography of the Gotland stones,[17] Scyld Scefing's funeral can hardly help illuminate the Gotland stones. In addition, the Old Icelandic literary evidence emphasizes, as does *Beowulf,* the *launching* of the ship of the dead (Baldr's funeral in Snorri Sturluson's *Edda)* or its *immobility* (Þorgrímr's funeral in *Gísla saga).* The best-known arrival in the world of the dead is that of Erik Bloodaxe, who, according to the poem *Eiríksmál* (traditionally dated to the mid-tenth century), arrived on horseback in Valhalla with his army. Both Odin and Hermóðr in the mythology are seen to arrive in the world of the dead, but they get there on horseback. Loki and the dead arrive via ship for Ragnarök, but that is an arrival in our world or that of the gods, not the world of the dead. To sum up: the dead were certainly imagined in ships at the border between the worlds of the living and the dead, but the evidence of the ship as the actual means of transport to the world of the dead is not strong.

Sune Lindquist observed that many of the Gotland stones of the chronologically latest layer, group E, contain runic inscriptions indicating that the stones are cenotaphs for Gotlanders who died abroad, and he generalized this context to the stones of groups C and D and suggested

10. "Ich sehe in ihm [das Bild vom Schiffe] ein vom künstler gern angewendetes schmuck- und füllmotiv, das nach einer deutung nicht verlangt. Natürlich wird es seine existenz der tatsache verdanken, dass die seefahrt ein wichtiges lebenselement der Gotländer war; aber es will meines erachtens nichts über eine bestimmte seefahrt aussagen." ("I see in it [the image of the ship] a motif gladly used by the artist for decoration and filling space, one that craves no explanation. Naturally it owes its existence to the fact that seafaring was an important element in the lives of the Gotlanders, but in my view it offers no evidence about any specific voyage" [author's translation, as throughout]). See Karl Helm, "Zu den gotländischen Bildsteinen," *Beiträge zur Geschichte der deutschen Sprache und Literatur* 62 (1938): 357.

11. Erik Moltke, "Lidt om gotlandske billedsten, især om Ardre VIII," *Fortid og nutid* 28 (1979-80): 77-83.

12. Ove Hemmendorff, "Människooffer: ett inslag i järnålderns gravritualer, belyst av ett fynd i Bollstanäs, Uppland," *Fornvännen* 79 (1984): 4-12.

13. Michael Müller-Wille, *Das Bootkammergrab von Haithabu,* Berichte über die Ausgrabungen in Haithabu, 8 (Neumünster: K. Wachholtz, 1976).

14. Erland Johansen, "Billedveven fra Haugen — en arkeologisk åpenbaring i farger: Landskap, skip og mennesker på Rolsvøy i vikingtid," *Viking* 49 (1985-86): 147-152.

15. Axel Olrik, *The Heroic Legends of Denmark,* trans. Lee M. Hollander (New York: The American-Scandinavian Foundation, 1919), 401.

16. John Hines, *The Scandinavian Character of Anglian England in the Pre-Viking Period,* British Archaeological Reports, 124 (Oxford, 1984); Helen Clarke, "English and Baltic Trade in the Middle Ages — An Evaluation of the Evidence," in Lindquist and Radhe, *Society and Trade in the Baltic,* 113-120; cf. Peter Sawyer, "Anglo-Scandinavian Trade in the Viking Age and After," in *Anglo-Saxon Monetary History: Essays in Memory of Michael Dolley,* ed. M. A. S. Blackburn (Leicester: Leicester University Press, 1986), 185-199. A direct historical connection between *Beowulf* and the Old Icelandic sources of early Swedish and Danish history has again been championed, this time by Gad Rausing, "Beowulf, Ynglingatal and the Ynglinga Saga: Fiction or History?" *Fornvännen* 80 (1985): 163-178.

17. For example, Alexander Bugge, *Vesterlandenes indflydelse paa nordboernes og særlig nordmændenes ydre kultur, levesæt og samfundsforhold i vikingetiden,* Videnskabs-selskabets skrifter, II. hist.-filos. kl., 1904, no. 1 (Christiania: J. Dybwad i kommission, 1905), 308-332.

Figure 5: Sailing *Krampmacken*, from Erik Nylén and Jan Peder Lamm, *Bildsteine auf Gotland* (Neumünster: K. Wachholtz, 1981), p. 23.

that the ships therefore must be those of the persons commemorated by the various stones. The evidence is fragile but suggestive. The runic inscription on the stone from Hablingbo church (L182-83, N90), the only stone from period E combining a text and a ship, is relevant to our inquiry: it has a scene of arrival on side A and a ship on side B. Both face left. Under and around the arrival is a runic snake with a now fragmentary text which reads something like this: "Hallgair and Fruste and Atle, they . . . after. . . ."[18] What makes this likely to have been a memorial inscription is the presence of the characteristic *eftiR* — "after, for, in memory of" — usually found in runic formulas like "so and so erected this stone in memory of *[eftiR]* such and such." Lindquist thought the stone, which was located near the church, was Christian despite the absence of Christian imagery, a supposition disputed by Jansson and Wessén.[19]

Perhaps even more relevant is the memorial inscription accompanying Alskog Tjängvide I (see figure 4 on page 42).[20] It is located just inside the right band of the lower register, just astern of the ship, and is to be read from bottom to top — that is, in a way that draws the eye from the ship scene to the scene above, an arrival on horseback. The reading of the first thirty-one runes presents few problems: ". . . erected the stone in memory of Hjorulf, his/her brother."[21] The remainder of the inscription, on the other hand, defies certain interpretation,

18. Sven B. F. Jansson and Elias Wessén, *Gotlands runinskrifter: granskade och tolkade*, part 1. Sveriges runinskrifter, 11 (Stockholm: Kungl. Vitterhets historie och antikvitets akademien, 1962), 77-81.

19. Ibid., 81.

20. The runes to the left of the figures behind the woman greeting the rider comprise the beginning of a *fuþark*-inscription (the runic alphabet) and an unclear fragment.

21. Jansson and Wessén, *Gotlands runinskrifter*, 195.

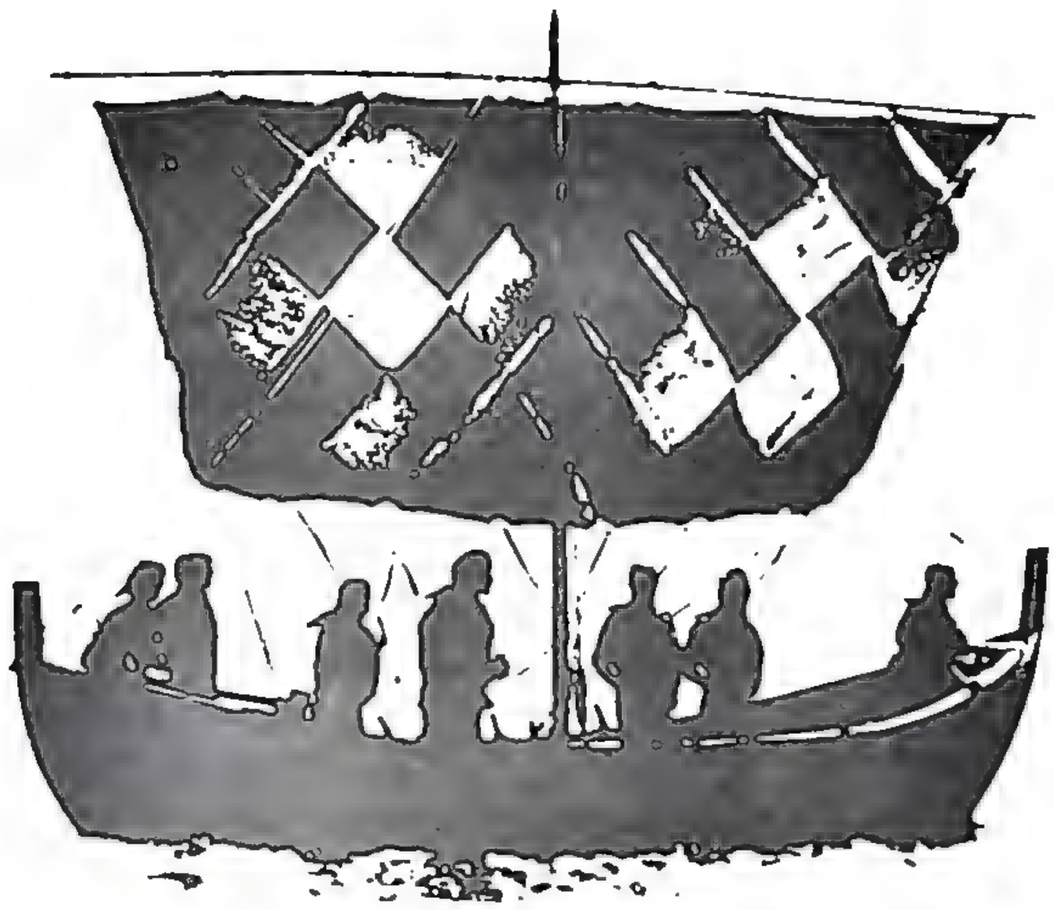

Figure 6: *Krampmacken*'s silhouette, from Nylén and Lamm, *Bildsteine auf Gotland*, p. 26. Compare the unparallel gunwales with those on the picture stones.

although it may be in verse or rhythmic alliterative prose. If it follows the standard formulaic patterns, it has something to say of Hjorulf — perhaps, according to many runologists, that he was betrayed by some group of people and died in a battle. That the stone might portray Hjorulf's journey to and reception in the world of the dead was recognized more than a century ago,[22] but certainty is impossible; we cannot even prove that the runic inscription was done along with the rest of the carving. The relationship of pictures and texts must remain a closed book. Alskog Ollajfs (N3; there is no figure in Lindquist), to cite another example, has a ship and a fragmentary memorial inscription ("after Roaldi, his/her/their father"),[23] but the stone is so weathered that the runes were all but gone thirty years ago and are known primarily from observations made more than thirty years before that, and little more than a sail and some waves can be discerned of the ship. The runic content is therefore tantalizing in its connection of the ship pictures and the dead but cannot suffice to eliminate the objections enumerated above. The findings of Erik Nylén, however, seem to me to permit these two views of the role of the ships — ships of the living and ships of the dead — to be reconciled.

Krampmacken demonstrated that the ships portrayed on the Gotland stones could be rowed, sailed, and portaged, and specifically that they could be sailed with the rigs shown on the stones. Actual testing demonstrated, according to Nylén, that the system of sheets could be used to maximize the sail area, and he observed enthusiastically that on *Krampmacken*'s first long voyage from Gotland to the Swedish coast and back — undertaken in the summer of 1981 with the express intention of testing the sail — vessel, sail, and crew functioned together like horse and rider [24] (see figure 5 opposite). With each crew member controlling a single line and hence a small portion of the sail, small adjustments were possible.[25] The independent appraisal of Owain Roberts supported the probability that the running rigging on *Krampmacken* solved the puzzle of the rigging details on the stones and enabled the shape and draft of the sail to be controlled.[26] A published photograph of the silhouette of *Krampmacken* under sail (see figure 6 above) looks eerily like the photographs of the picture stones carved a thousand years ago.

There can be no doubt whatever that the ships on the Gotland picture stones are sailing. The direction of the

22. Hans Hildebrand, "Från jemåldern," *Kungl. Vitterhets historie och antikvitets akademiens månadsblad* (1880): 22.

23. Jansson and Wessén, *Gotlands runinskrifter*, 190.

24. Nylén, "Med *Krampmacken* över Gotland och Östersjön," 42.

25. That the rig suggested by the Gotlandic picture stones might be used in such a way was earlier suggested by Bertil Almgren, "Vikingatåg och vikingaskepp," *Tor* 8 (1962): 190, who thought it might have conferred an advantage to ships maneuvering in battle. This supposition was brought into the English-reading world by Peter Sawyer, *The Age of the Vikings*, 2d. ed. (London: E. Arnold, 1971), 75. It accords well with Sawyer's contention that Gotlandic wealth was amassed through raiding but is not inconsistent with the position I attempt to argue here.

26. Owain Roberts, "Viking Sailing Performance," in *Aspects of Maritime Archaeology and Ethnography*, ed. Seán McGrail (Greenwich: National Maritime Museum, 1984), 123-151.

wavetops, which suggests a strong breeze from behind the ships, indicates that they are sailing downwind. If, however, the ships are running downwind, the yard appears to be in the wrong place. Unless we are simply dealing with primitive perspective, with every pictorial element in full profile, the yard parallel to the hull suggests a beam reach, which was as close to the wind as the modern experiments have been able to sail. A beam reach, however, would contradict the run suggested by the waves.[27] And bringing the yard parallel, as it is on the stones, would presumably, in the absence of a brace even on a beam reach, render the sail likely to backing and would be positively dangerous.[28] Nor does it seem likely that a crew could or would sail for very long with each crew member tugging on a sheet, as is routinely the case on the larger ships portrayed on the Gotland stones. If the crew on these stones is not brailing, as seems unlikely given the testimony of *Krampmacken*, I can think of only one practical explanation. The yard is parallel to the ship, and all hands are trimming sheets, because the ship is slowing before the wind. Before the wind, sail power would be most reduced by aligning the yard with the wind direction; just as the sheets could, according to Nylén, be used to maximize sail area, so could they presumably be used to reduce the amount of sail actually drawing. I therefore conclude, tentatively, that the ships are slowing before the wind. The logical circumstance for such slowing would be in connection with a landfall or actual landing.[29] I believe there is supporting evidence for this claim.

Several of the stones of periods C and D have the following arrangement of scenes: displayed prominently at the bottom or middle of the stone are the waves, on top of which rides the ship; waves and ship point in the same direction, and together they make up a single scene. It is noteworthy that the system of running rigging seems to be emphasized, most spectacularly on Stenkyrka Smiss I (L97-102, N295; see figure 7 opposite).[30] Above this scene there is often some banding, indicating separation of

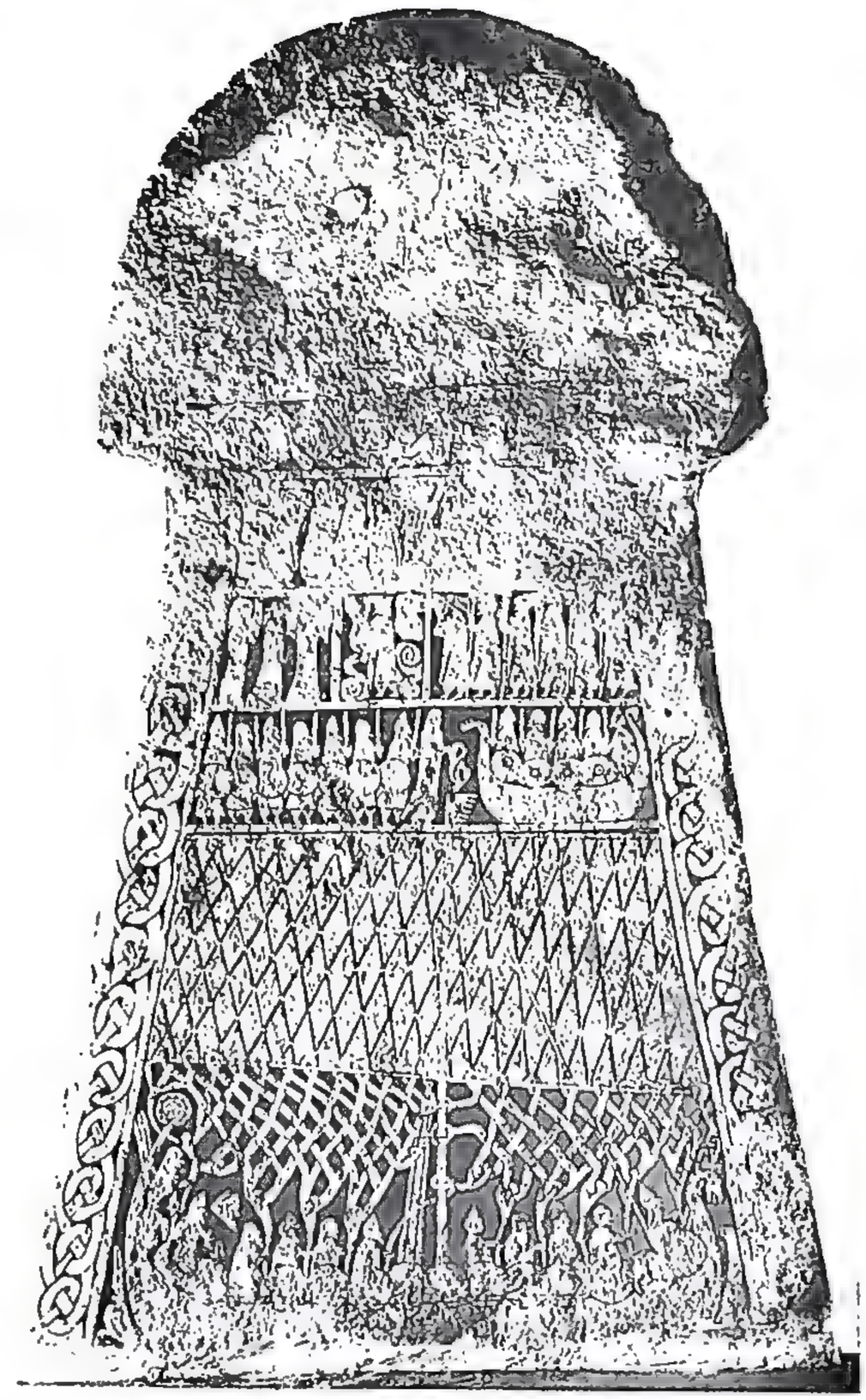

Figure 7: Stenkyrka Smiss I, from Lindquist, *Gotlands Bildsteine*, figure 97.

scenes, and in the next scene above we find a rider on horseback, taken by all observers to be male, before whom stands a woman (her gender is sometimes indicated by the bun in her hair) holding up an object before her, apparently to offer it to the rider. These range from such simple stones as Halla Broa III (L108, N103), Halla Broa IV (L105, 116-17, N104), and Väte Gullarve (L78, N340), to such complex iconographic monuments as Lärbro Tängelgårda I (see figure 1 on page 40), Klinte Hunninge I (L128- 31, N153), Lärbro Stora Hammars III (L85, N168; see figure 8 on page 47), Alskog Tjängvide I (see figure 4 on page 42), and Ardre VIII (see figure 3 on page 41). Because of the apparently eight-legged horses on the latter two stones, this scene is sometimes called the "Valhalla scene," although a controversy surrounds not only the identification of the horse with Sleipnir, Odin's horse, but

27. The photo of *Krampmacken* in figure 6 on page 45, apparently showing the yard parallel to the ship, is deceptive. The photo shows the other gunwale in perspective. The stones do not.

28. Roberts, "Viking Sailing Performance," 128-131.

29. I confess to an inclination toward this interpretation based on my own experience making landings on modern sailboats in tricky downwind berths. To keep just enough sail drawing so that the boat would respond to the helm, I have held in place a few square feet of a doused main sail while a grim-faced helmsman/owner steered his vessel toward the dock and cursed the failed engine. I offer this not as evidence of the handling of a Viking Age or any other kind of vessel, merely as a suggestive parallel.

30. Could the trapezoidal shape of the sail on this stone be an attempt to indicate a reach? There are no waves below the ship to gauge wind direction, and the apparent lack of greeting scene above separates this stone from those I attempt to associate with arrivals.

Figure 8: Lärbro Stora Hammars III, from Lindquist, *Gotlands Bildsteine*, figure 85.

also that of the rider if it is Sleipnir.[31] Although most scholars agree at least to refer to the woman as a valkyrie, I prefer to regard the scene simply as one involving greeting or welcome.

Several other stones may also fit this pattern. Stenkyrka Lillbjärs III (L104, 111-12, 114-15, N279) and Garda Bote (L141, 144, N68), for example, have the requisite scenes, but some other scene or object intervenes between them, and Klinte parish (Klinte Hunninge IV in Nylén 1978 and in Nylén and Lamm 1981; L134, N156) has a pair of opposed riders between the waves and ship as well as the greeting scene above it. Lärbro Stora Hammars IV (L83, N187) is fragmentary but almost certainly fits the pattern, and Halla Broa XVI (L394-96, N116) is fragmentary and has an intervening scene. Lärbro Tängelgårda III is so weathered that it is unclear whether the rider above the ship is being greeted.

The connection of the ship scenes and the so-called Valhalla or greeting scenes is assured, it seems to me, by their propinquity on the stones (horse arrival above apparent ship arrival), by the interconnection of the scenes (the mast intrudes into the horse scene on some stones), and, most important, by the fact that in all but one case (Klinte Hunninge I), the ship and horse are pointing in the same direction.

Where might these arrivals be taking place? Because Lindquist identified elements of the goddess Victory in the so-called valkyries on the stones, one might imagine that the arrival is abroad, where the Gotlander was victorious in some battle. No scenes from Old Norse myth or legend, for which Karl Hauck legitimized the search on the Gotland stones,[32] will fit, and it is to other Germanic tradition that one must turn to locate even a potential (and then only partial) parallel in narrative: the type-scene of the "hero on the beach," which has enjoyed a small scholarly discussion over the last few decades.[33] Originally formulated by David K. Crowne on the basis of Old English verse,[34] it was taken up by many scholars in that area and was spread to the Old High German *Hildebrandslied* and Middle High German *Nibelungenlied* by Alain Renoir.[35] Although Renoir admits an Old English predecessor to the *Hildebrandslied*, and the *Nibelungenlied* significantly postdates even the latest Gotland stones, such research operates with the conception of a Germanic cycle of stories that would be necessary to recognize a remnant

31. Detlev Ellmers, in "Der frühmittelalterliche Hafen der Ingelheimer Kaiserplatz und gotländische Bildsteine," *Schiff und Zeit* 1 (1973): 52-57, advanced the suggestion that the rider is someone whom Odin has sent Sleipnir to fetch from a landing place at the beach, a suggestion that aroused Erik Moltke to heights of irony: "rather as we would today send a Rolls Royce or a Buick to receive oil sheiks or other potentates" (Erik Moltke, "Lidt om gotlandske billedsten," 79).

32. Karl Hauck, "Brieflicher Hinweis auf eine kleine ostnordische Bilder-Edda," in *Sonderband* [of *Beiträge zur Geschichte der deutschen Sprache und Literatur] Elisabeth Karg-Gasterstädt zum 75. Geburtstag gewidmet*, ed. Gertraud Müller and Rudolf Grosse (Halle: M. Niemeyer, 1961): 47-67; reprinted in K. Hauck, ed., *Zur germanisch-deutschen Heldensage: Sechzen Aufsätze zum neuen Forschungsstand*, Wege der Forschung, 14 (Darmstadt: Wissenschaftliche Buchgesellschaft, 1961), 427-449.

33. For summary, discussion, and references, see Alexandra Hennessey Olsen, "Oral-formulaic Research in Old English Studies, part 1," *Oral Tradition* 1 (1986): 583-584.

34. David K. Crowne, "The Hero on the Beach: An Example of Composition by Theme in Anglo-Saxon Poetry," *Neuphilologische Mitteilungen* 61 (1960): 362-372.

35. Alain Renoir, "The Armor of the *Hildebrandslied:* An Oral-formulaic Point of View," *Neuphilologische Mitteilungen* 78 (1977): 389-395; idem, "Oral-formulaic Theme Survival: A Possible Instance in the 'Nibelungenlied'," *Neuphilologische Mitteilungen* 65 (1964): 70-75.

of the theme on the Gotland stones, and indeed, Olsen invites speculation on a possible Indo-European distribution of the theme.[36] No more than a remnant would be thinkable on the Gotland stones, however, since although the motival basis of the type-scene indeed involves a hero with his retinue as a journey is ended or begun, it also includes a location on a beach or, arguably, near some other boundary, such as a door, in the presence of a flashing light.[37] An arrival abroad would therefore have to do more with some Gotlander's exploits in battle than any recognizable mythic or heroic scene.

The stones are not unanimous, however, in showing battles, and some of the crews appear to be unarmed, despite the shields affixed to the sides of some of the ships. Although we will never know, it seems unlikely to me that the carvers would focus on the movements of the ships and the greeting of the heroes after battle and eliminate the battle scenes themselves about which these two scenes might turn. For that reason, I would hazard the guess that an arrival on Gotland may also be involved, at least on some of the stones. These stones are magnificent monuments, ones that must have taken much time and effort to create. They were presumably the property of the wealthy in Viking Age Gotland, and that meant the travelers. As the experiments with *Krampmacken* demonstrated, Gotlandic traders could have used ships like those portrayed on the stones to transport goods from one part of a vast water-connected world to another: perhaps Swedish iron to the eastern European river systems, as the more recent work has it, or furs and slaves.[38] For the most part, Gotland itself does not seem to have been a trading destination. Gotland was instead the place to which the traders returned with their silver. If, as Peter Sawyer has argued,[39] and Anders Carlsson has accepted,[40] they acquired some or even most of their silver through raiding, we may have an explanation for the presence of armed warriors aboard some ships but not others, and the arrivals may therefore be both abroad and on Gotland. In any case, whether traders or raiders, the Gotlanders "returned after each voyage abroad with the silver they had acquired, which was stored in the subterranean safe deposit box on the home farm, often to the joy and delight of future relatives and eager archaeologists."[41]

The lives of these sailors and of their families must therefore have been punctuated by the rhythm of their goings and comings, and the comings in particular would have been joyous moments. Nylén's practical experiment led him to the finding that the kind of journey he postulates — from Gotland to the Black Sea — would require a great deal more than previous estimates, probably four years.[42] However, one need hardly accept the likelihood of voyages of such extreme length, or indeed the rest of Nylén's argument regarding the accumulation of wealth on Gotland, to entertain the hypothesis I wish to advance concerning arrivals: safe returns from short, dangerous raiding expeditions would presumably generate just as much enthusiasm as safe returns from long trading expeditions. Whatever else the stones mean, then, they can certainly be understood in the context of (a)rhythmic arrivals.[43] Here it is important to note the lack of Gotlandic women's brooches within the archaeological record along the Russian rivers, a lack which Nylén takes as evidence that Gotlandic women did not, as women from mainland Sweden did, accompany their husbands abroad.[44] They thus would have had every reason to await the travelers' returns — with or without silver — and to celebrate them appropriately. Remember that the Gotland picture stones are without direct parallel on the Swedish mainland. If we follow Sawyer in emphasizing the raiding activities of Gotlanders, we would also not expect women to leave brooches along the Russian rivers but rather to await at home their husbands, brothers, and sons, and to celebrate their return from dangerous but lucrative voyages.

36. Olsen, "Oral-formulaic Research," 583-584.

37. Renoir, "Oral-formulaic Theme Survival;" James D. Johnson, "A Note on the Substitution of 'Door' for 'Beach' in a Formulaic Theme," *Neophilologus* 67 (1983): 596-598.

38. Hugo Yrwing, "Gotlandshandel," *Kulturhistoriskt lexikon för nordisk medeltid* 5 (1960): 391-398.

39. Peter Sawyer, *Kings and Vikings: Scandinavia and Europe AD 700-1100* (London and New York: Methuen, 1982), 125, 145; idem, "Birka, the Baltic and Beyond," in Lindquist and Radhe, *Society and Trade in the Baltic*, 165-170.

40. Anders Carlsson, review of Peter Sawyer, *Kings and Vikings*, *Fornvännen* 78 (1983): 287-292.

41. ". . . återkom efter varje utfärd med sitt förvärvade silver som deponerades i hemgårdens jordnära bankfack ofta till framtida släktingars och vetgiriga arkeologers fägnad och glädje . . ." (Nylén, "Segla, ro, släpa och dra–skepp till Miklagård," 22).

42. Nylén, "Das Wikingerschiff im Ostseeraum," 264.

43. The rider in the scenes of rider on horseback is often seemingly greeted by a woman with a mead cup, which as we know from such texts as *Beowulf*, in which Wealhþeow performs this function, was a part of celebration after successful journeys. The most noteworthy example in Norse mythology occurs in Snorri Sturluson's *Edda*, when Freyja serves the giant Hrungnir, who has just impetuously dashed into Valhalla. If Snorri did not simply intend this scene to be taken ironically, it demonstrates the constant threat the giants pose to the gods, and particularly to the person of Freyja, who here must act as though the giant's journey were a success.

44. Nylén, "Segla, ro, släpa och dra–skepp till Miklagård," 22. Peter Hallberg draws attention to a common theme in skaldic poetry (and therefore directly relevant to the North Atlantic, not the Baltic): "the man at sea – the woman at home." See Hallberg, "The Ship – Reality and Image in Old Norse Poetry," in *The Vikings: Proceedings of the Symposium of the Faculty of Arts in Uppsala University June 6-9, 1977*, ed. Thorsten Andersson and Karl Inge Sandred, Acta Universitatis Upsaliensis, Symposia Universitatis Upsaliensis Annum Quingentesimum Celebrantis, 8 (Uppsala: University of Uppsala; distr. by Almqvist & Wiksell), 46-47.

What of Sleipnir, Odin, the valkyries, and Valhalla? If two of the horse scenes indeed portray Odin mounted on Sleipnir, holding perhaps a cup of the precious mead he has obtained in a variant of the well-known myth of his acquisition of the mead of poetry, as Gustaf Trotzig recently argued,[45] we witness a moment of triumphal return, with a valuable acquisition, in the mythic world. Such a return might well have appeared particularly relevant when a Gotlander arrived home after an arduous trading journey of four years, but would be hardly irrelevant to a return from a quick but risky raid on the surrounding Baltic coast. In either case, the traveler might be bearing coffers of silver.

Indeed, in this light we may speculate on some of the other possible mythological scenes on the stones. On Lärbro Stora Hammars III, some scholars have identified Odin's theft of the mead of poetry — a different moment of the acquisition pattern that I suggest may inform these stones and one that may well be echoed in some of the battle scenes. Indeed, it is worth recalling that the myth in its entirety, at least as recounted by Snorri Sturluson in his *Edda*, focuses on the return, when Odin comes flying back in the form of an eagle with the mead in his mouth and the giant Suttungr in hot pursuit. On Ardre VIII (see figure 3 on page 41), the most suggestive stone, Thor's fishing expedition for the Midgard serpent appears to some scholars to be present, and perhaps also the moment when he tears off the head of Hymir's ox for bait. According to the poem *Hymiskviða*, that expedition was undertaken as part of an attempt to obtain a large kettle in which to brew beer — in other words, it is part of a myth of acquisition.[46] On the same stone, Ludwig Buisson has claimed to see Loki and the web pattern that becomes a fishing net — yet another object of cultural value to which the mythology assigns a mythic origin.[47] In other words, some of the scenes portrayed on the stones may involve tales of acquisition, acquisition that was later celebrated with a return of some sort.

Other scenes portrayed on the stones have been identified as Gunnar in the snake pit and the unending battle of the Hildr legend. Since the use of such scenes from myth and legend is positively attested elsewhere in the Norse world in stones with memorial runic inscriptions, such as the carving of the Sigurd legend on a flat stone slab in Ramsundsberga, Sweden, accompanying a runic appeal by a woman for the benefit of her father-in-law's soul, we must accept their appropriateness as cenotaphs. Nevertheless, such cenotaphs could only celebrate men wealthy and powerful enough to permit their heirs to hire masters with the skill and time to create monuments as impressive as the Gotland stones. And the source of such wealth on Gotland could only be previous voyages abroad, voyages which had ended successfully with returns. In the case of a cenotaph, however, the last arrival is not on Gotland but in the other world. There the deceased will be met with joy similar to that which attended his arrivals home in this world, and which the gods enjoyed when they arrived home with their acquisitions of cultural and mythic importance. Consider Lärbro Tängelgårda I (see figure 1 on page 40): persons apparently bear such symbols of wealth as rings and weapons in the arrival scene, above which is a scene in which men walk with swords down, which should indicate a funeral.

Let me make this clear: it hardly matters whether the stones portray Odin and Sleipnir or some other rider on a galloping horse. In either case the stones would be about arrivals, most probably with acquisitions. The point is the multivalence of the signs as symbols. This agrees with the role of the ship itself in an island culture: it was basic to life, and according to the archaeological record, basic also to conceptions of the afterlife. Thus the question is not whether the ships pictured on the stones are ships of the dead or ships of the living. Rather, the question is: what is the context of these portraits of ships?

At this point, let me summarize the argument I have been attempting. Previous uncertainty about the rigging details of the Gotland picture stones has been dispelled by the testimony of *Krampmacken*. The crews on the larger ships are sailing. But there is a basic anomaly: if they are sailing, why is the yard parallel to the keel? And why do the stones appear to accentuate the complex running rigging? From among the many possibilities, I suggest that the ship may be arriving, an arrival that is paralleled by the arrival scene directly above the ship on several stones, a scene generally oriented in the same direction as the ship scenes. Archaeology demonstrates that Gotlanders traveled abroad on voyages of acquisition, without their women, and the stones have scenes of acquisition from the mythology. Other scenes may suggest bravery in the face of death, and the one stone from period E with both ship and runic inscription apparently contained an inscription of a memorial nature. Thus my conclusion is that the stones with sailing ships and Valhalla or greeting scenes in close proximity could have had to do simultaneously with the earthly voyages and returns of wealthy and powerful Gotlanders, with their deaths abroad, and with

45. Gustaf Trotzig, "Ett bildstensmotiv i arkeologisk belysning," *Gotländskt arkiv* 53 (1981): 31-38.

46. Thor may be involved in other scenes on this stone too – these problems of interpretation are desperately difficult – and if so, I would simply note that Thor is a god who travels and therefore frequently returns.

47. Ludwig Buisson, *Der Bildstein Ardre VIII auf Gotland: Göttermythen, Heldensagen und Jenseitsglaube der Germanen im 8. Jahrhundert n. Chr.*, Abhandlungen der Akademie der Wissenschaften in Göttingen, Philologisch-historische Klasse, ser. 3, 102 (Göttingen: Vandenhoeck & Ruprecht, 1976).

their final journeys to the other world. The pictorial scenes and their interrelationships are symbolic and multivalent, and it would be a mistake to insist on a single interpretation. Perhaps these stones even demonstrate the same delight in multiple meanings that those citizens of the western part of the Norse world cherished in the verse of the skalds.

This is not to say that other ships on the stones may not be more closely aligned with ships of the dead. Gert Kreutzer observes that the majority of the ships equipped with rudders — nine out of fifteen — show the rudder on the port rather than the expected starboard side of the vessel, but he passes over the possible significance:

> "Wenn wir es hier nicht mit einer betrüblichen Unkenntnis des Bildhauers in seemännischen Dingen zu tun haben — dies dürfte bei einem Gotländer schwer denkbar sein —, dann gibt es uns das Grund zum Nachdenken. Setzte sich die rechte Seite für das Steuerruder erst im Laufe der Zeit durch oder gab es vielleicht Schiffe für Linkshänder? Lassen wir diese Frage auf sich beruhen. . . ."[48]

If we agree that the technicians would not make so basic an error as to place the rudder on the wrong side — and that their patrons would not accept such an error — and if we hold it unlikely that the artists would have shown the rudder through the ship, we must indeed wonder. The ships with left-handed rudders identified by Kreutzer are found in periods B-E, and there are nine all told.[49] Kreutzer only located six ships with rudders where they belong, to starboard.[50] Whether or not one quibbles with Kreutzer's assignment of rudders to port or starboard, the distribution is interesting: none of the stones with "left-handed" ruddered ships has the scene of a rider on horseback being greeted by a woman, which I believe involves the ship in a return scene. Only Halla Broa III comes close, since it has a rider above the ship and pointing in the same direction, but the register is unclear at the point where the woman would be. Of the six stones with properly ruddered ships, on the other hand, three are among those I have been discussing, one is a close variant, and two have unclear upper registers, although it must be admitted that it is difficult to imagine a rider's return on Lärbro Tängelgårda II. Is this distribution coincidental? If not, I would suggest that the ships on the stones with return symbolism have the rudders where they belong for precisely the same reason that the sails and rigging are accurately portrayed: these are real ships. As for the ships with port-mounted rudders, one might speculate that they are ships of some other world, a topsy-turvy world where right is left. Perhaps these really are the ships of the dead.

If the Gotland stones indeed present a multivalent symbolic world emphasizing scenes and implications of returns, they may be useful in helping to correct a common misconception about the mythology we find recorded in West Scandinavian sources. Some observers have found this mythology unique and pessimistic, because the gods die. This reading should not be taken seriously, because it is contradicted by the synoptic poem *Völuspá*, probably from ca. A.D. 1000, and by the *Gylfaginning* in Snorri Sturluson's *Edda*, each of which permits a new generation of gods to inhabit the earth after Ragnarök. Such a cyclic pattern is fully consistent with what scholars of comparative religion such as Mircea Eliade have called the myth of the eternal return,[51] a myth that even scholars of early Scandinavian religion have begun to discover in their own materials.[52] The Gotland picture stones suggest to me a similarly optimistic world view, in which the joys and accomplishments of life are celebrated and simultaneously translated into the world of life after death.

48. "If we are not dealing here with a sad ignorance of nautical matters on the part of the carver — this would be difficult to imagine in a Gotlander — then it gives us grounds for contemplation. Did the right side become the appropriate side for the rudder only with the passage of time, or were there perhaps ships for left-handers? Let us leave this question alone." (Gert Kreutzer, "Schiffe für Linkshänder und achtbeinige Pferde: Gotländische Bildsteine als kulturgeschichtliche Quelle," in *Gotland: Tausend Jahre Kultur- und Wirtschaftsgeschichte im Ostseeraum*, ed. Robert Bohn (Sigmarinen: J. Thorbecke, 1988), 13.)

49. När Rikvide (L35, N202), Lärbro Källstäde (L43, N176), Eskelhem Larsarve I (L71, N54a), Hejnum Rings (L77, N139), Lärbro Stora Hammars I, Stenkyrka Smiss I (L97, 522/295), Halla Broa III, När Smiss I (L142, N203), Hablingbo church.

50. Hejnum Riddare (L79-80/138), Lärbro Tängelgårda I (figure 1), Lärbro Tängelgårda II (L89, N190), Stenkyrka Lillbjärs III, Halla Broa IV, Klinte Hunninge III (L132, N155).

51. Mircea Eliade, *The Myth of the Eternal Return: or, Cosmos and History*, trans. Willard R. Trask, rev. ed. (Princeton, NJ: Princeton University Press, 1971).

52. For example, Jens Peter Schjødt, "Völuspá—cyklisk tidsopfattelse i gammelnordisk religion," *Danske studier* 76 (1981): 91-95.

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An American Gun in the Netherlands

W. G. M. H. CANISIUS

Sometimes historical objects stray from their birthground, so that the material evidence of a historical phenomenon can only be found thousands of miles from its origin. Of the "repeating guns" used by the American navy in the Anglo-American War (1812-1814) and on American men-of-war in the Mediterranean against pirates, only two have survived. One is in the Musée d'Armes in Liège in Belgium and the other, a smaller version, is in the Rijksmuseum in Amsterdam, the Netherlands.

Early firearms had two major drawbacks: they were slow to load and could fire only one projectile at a time. Several systems were developed to surmount this handicap.[1] One example, now in the Dutch navy's model collection in the Rijksmuseum (number 791), is a repeating gun with seven barrels and a flintlock that fired forty-two rounds in one volley (see figure 1, below).[2] The weapon is a muzzle-loader with six barrels encircling a seventh, held together by two forged strips. The beautifully ornamented forward firing flintlock, signed "Haslett," is fitted on the left and has a lanyard (see figure 2, page 53).[3] The barrels have a 14.8-millimeter calibre and a smooth 292-millimeter bore. The breeches are closed with breechplugs, topped with a stud; these fit in holes in the guard-plate, to which they are screwed (see figure 3, page 53). The central barrel has a tailpiece sticking through the

1. For examples, see G. Doorman, *Patents for Inventions in the Netherlands during the 16th, 17th and 18th Centuries* (The Hague: Netherlands Patent Board, 1942), 106; the earliest example Doorman mentions is from 1601 (G 62). See also Thomas T. Hoopes, "The Function of the Perfected Lorenzoni Repeating Flintlock System," and Fred H. Baer, "Napoleon Was Not Afraid of It" in *Arms and Armour Annual*, vol. 1, ed. Robert Held (Northfield, IL, 1978), 216 and 250, for examples of other systems. Many other examples could be cited.

2. J. M. Obreen, *Catalogus der verzameling van modellen, van het Departement van Marine* (The Hague, 1958), number 791. The Dutch navy's former collection was transferred entirely to the Rijksmuseum in 1883-1887.

3. For a short biography of James Haslett, see Colonel Robert E. Gardner, *Small Armsmakers, A Directory of Fabricators of Firearms, Edged Weapons, Crossbows and Polearms* (New York, 1968), 86, and J. J. Hayward, *The Art of the Gunmaker*, vol. 2, 1660-1830 (London, n.d.), 277.

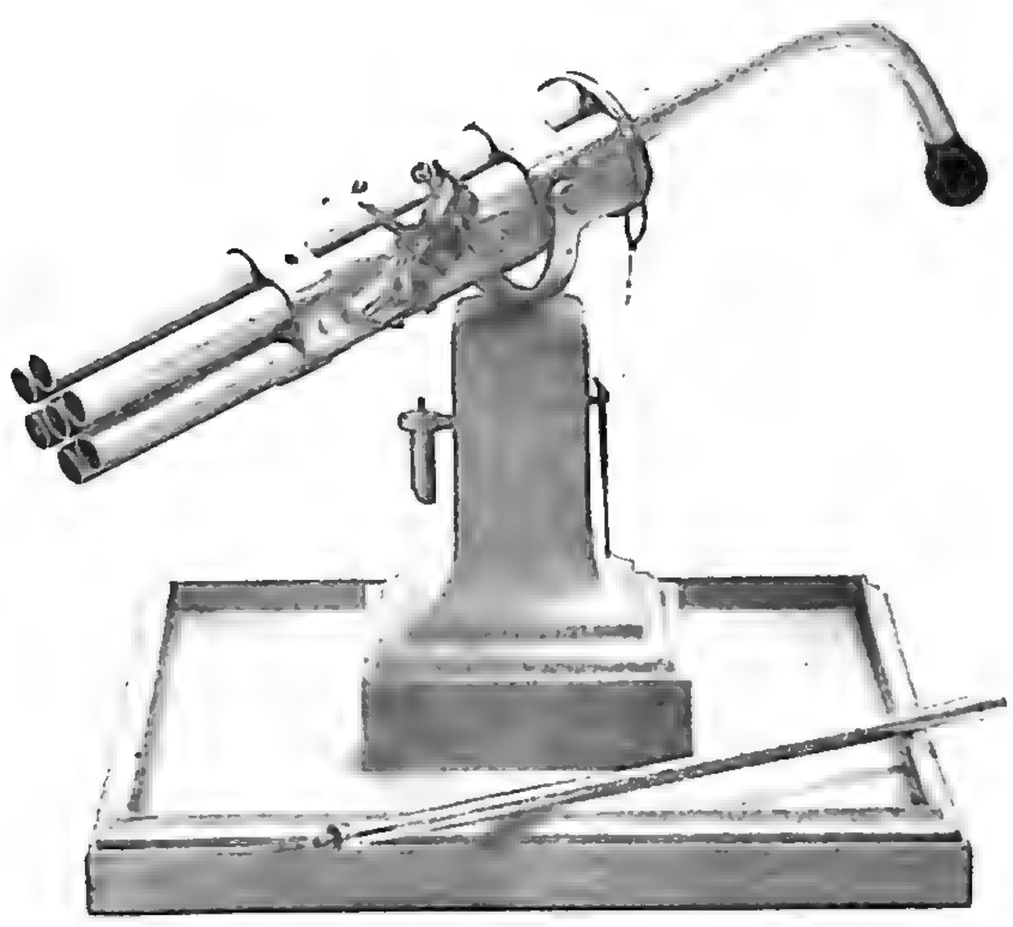


Figure 1: The "American repeating gun" in the model collection of the Rijksmuseum, Department of Dutch History, inventory number 791. Note the powder-measure, primer, and ramrod.

guard-plate, fitted with a but. The barrels are held in place by a thick metal plate, in which channels are bored connecting the central and outer barrels. These channels pass the spark on when the gun is fired (see figure 4, number 5, opposite).

Each barrel was loaded with six charges in a row. All bullets except the first were run through and the hole was filled with very fine gunpowder. The principle of passing on the spark through consecutive bullets in the same barrel is known as the "Roman candle" principle. [4] It is still used in fireworks today.[5] Loading must have been a tedious job. For each charge, the operator first had to load powder into the barrel, then carefully place the bullet with the hole in a longitudinal direction using the iron ramrod, which has markings on the side to measure the position of the charges. It was imperative that the first spark hit the first charge in the barrel. Bullets for muzzle-loaders have to be of a smaller diameter than the actual calibre. To prevent the spark from passing on wildly, the bullets had to be rolled into a small, greased cotton rag, which sealed off the space between the bullet and the wall of the barrel (see figure 5, number 4).[6] The channels connecting the barrels had to be cleaned after loading to rid them of any possible blockage by threads of cotton or other dirt. To facilitate cleaning, the outer barrels of the gun have an extra opening in the side opposite the channels that connect to the central barrel, and the opening is closed tight with a bolt (see figure 4, number 8). After the vent was cleaned with the primer (see figure 1), the last charge was placed. On firing, the spark of the flintlock hit the first charge of barrel number one through the vent (see figure 6A). Then it passed on to the second charge in barrel number one straight through the second bullet, but also to the first charge of the central barrel (see figure 6B) and from there to the first charges of the other barrels through the connecting channels (see figure 6C). In each barrel the spark was then passed on through the holes in the bullets to the next in line, until all bullets were fired. Black powder takes a very short time to burn, and the resulting effect was that the bullets left each barrel in successive order, enabling the operator to swivel the gun while firing and find his mark. Once triggered, the firing could not be stopped.

4. Tenney L. Davis, *The Chemistry of Powder and Explosives* (New York, 1943). The Arabs probably used the "Roman candle" as a weapon during the Crusade of King Louis IX of France (1248-1254).

5. Hayward, *Art of the Gunmaker*, 280, gives as an example of a forerunner of the American swivel the gun patented by Charles Cardiff in London in 1682.

6. "Onderrigt voor het laden van de repeterende pistool met 7 lopen," 14 July 1820, N 22, Appendix 3 in Algemeen Rijksarchief, 2.12.01, Ministerie van Marine 1813-1940 (hereafter ARA).

In the United States, where this gun was made, guns operating on the "Roman candle" principle first appeared during the War of Independence. Joseph Belton proposed a new type of firearm to Congress in a letter of 11 April 1777.[7] He secured an order to adapt a hundred muskets to the "Roman candle" principle, firing eight bullets at a time. Nothing is known about their use in combat, however. Belton later approached the English quartermaster-general, the Duke of Richmond, with the idea, and a weapon was tried in Woolwich in 1784, after which it was deposited in the Royal Military Depository. Belton received £15 15s for the invention and £6 6s for the weapon itself, but got no order for production.[8] The description of the gun in the Official Catalogue of the Museum of Artillery in the Rotunda, Woolwich, indicates that it was a single-barrelled weapon.

Because of the war with England in 1812-1815, the demand for firepower in America increased dramatically. Joseph Chambers was granted a patent for "Repeating Gunnery" on 23 March 1813. He probably drew on the ideas of Joseph Belton, but this cannot be verified because a fire destroyed the patent office in 1836.[9] Chambers first approached the Defense Department in 1812 but was rejected by a special committee, which judged the weapon too dangerous for the user in spite of its great destructive power. The inventor then turned to the navy, where the weapon was adopted by Isaac Chauncey.[10] Chambers received an order for two hundred "repeating muskets" and twenty "repeating swivels," all working on the "Roman candle" principle as stated in the contract of 17 February 1814. For the first time, multibarrelled "Roman candle" weapons appeared. The "swivels" had seven barrels, like the Rijksmuseum model, but their bore had the length of the barrel of a musket (four feet, or 1.22 meters), and they were loaded with thirty-two charges each, a total of 224 rounds.[11] The American navy wanted to equip men-of-war with six swivels in the main top. Chambers was appointed to the rank of sailing master, and his two sons were charged with the instruction of future gunners. On 14 April 1814, Commodore William Bainbridge of the Charleston dockyard ordered a number of Chambers's weapons to be dispatched to Commodore Chauncey, who was leading the American squadron against the English on

7. Hayward, *Art of the Gunmaker*, 279; Captain D. R. Baxter, *Superimposed Load Firearms* (Hong Kong, 1966), 154.

8. Howard L. Blackmore, *British Military Firearms, 1650-1850* (London, n.d.), 249.

9. Baxter, *Superimposed Load Firearms*, 205.

10. Commodore William Bainbridge to Dutch Rear Admiral H. H. Ruysch, 8 March 1821, N 6, ARA.

11. Baxter, *Superimposed Load Firearms*, 206, 208, 308; see also the repeating gun in the collection of the Musée d'Armes in Liège, mentioned below.

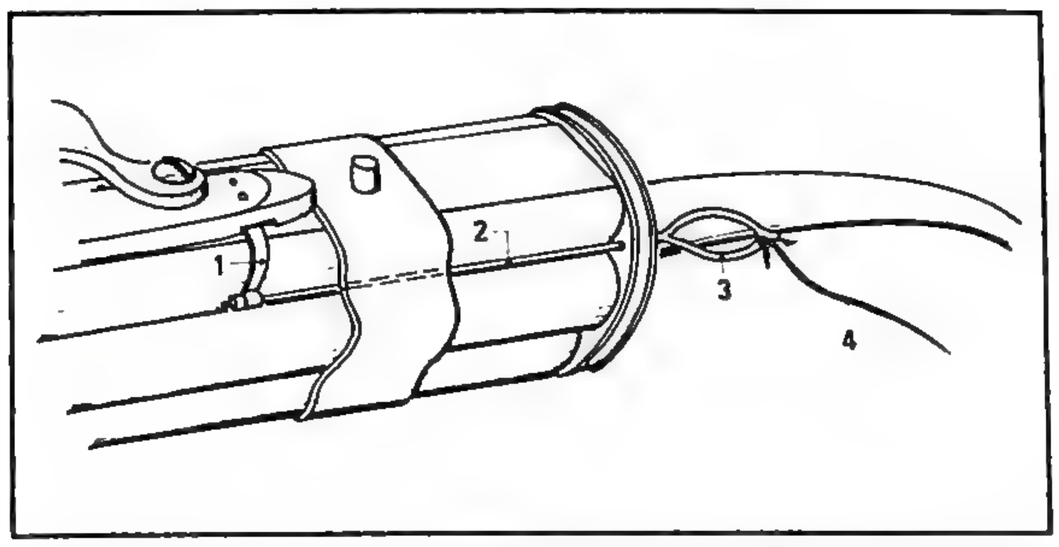


Figure 2: The firing mechanism, consisting of trigger (1), wire (2), ring (3), and lanyard (4). Drawing by A. F. Hoekstra, 1990.

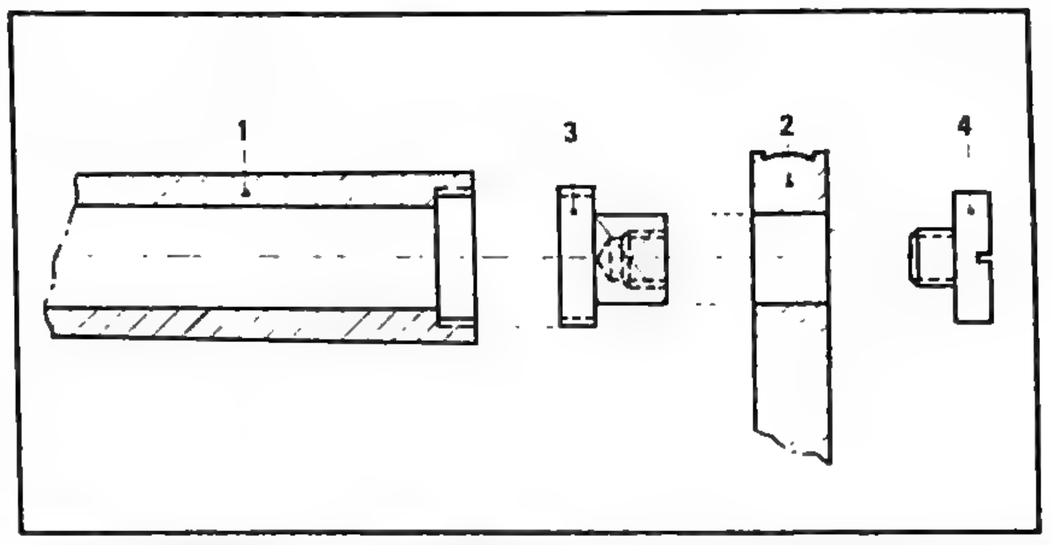


Figure 3: Barrel (1), guard-plate (2), stud and screw (3), and fixing screw (4). Drawing by A. F. Hoekstra, 1990.

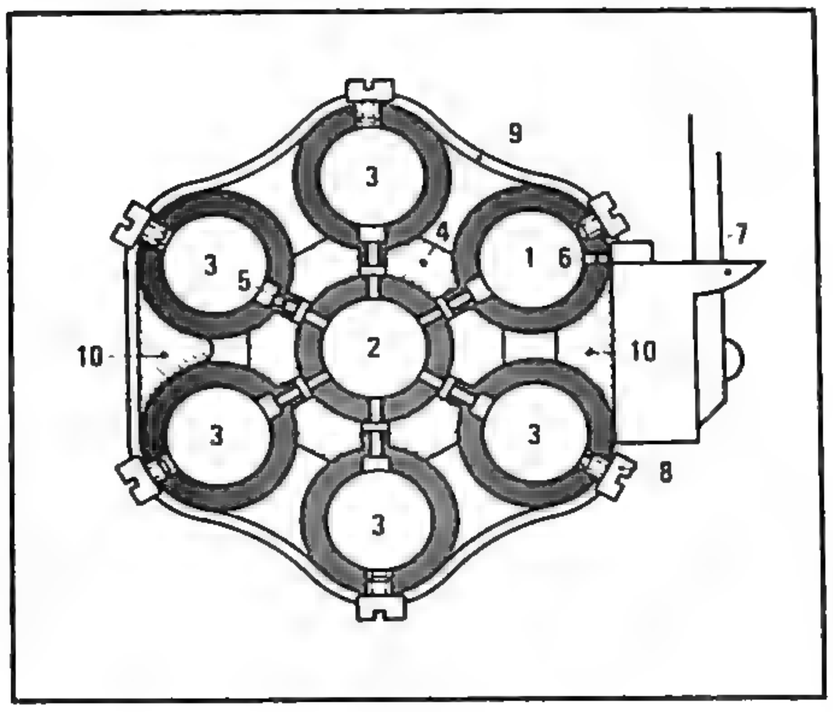


Figure 4: Cross section of first barrel (1), second, central barrel (2), other barrels (3), plate (4), connecting channels with copper cylinders (5), vent (6), pan (7), cleaning hole with bolt (8), strip (9), filling pieces (10). Drawing by A. F. Hoekstra, 1990.

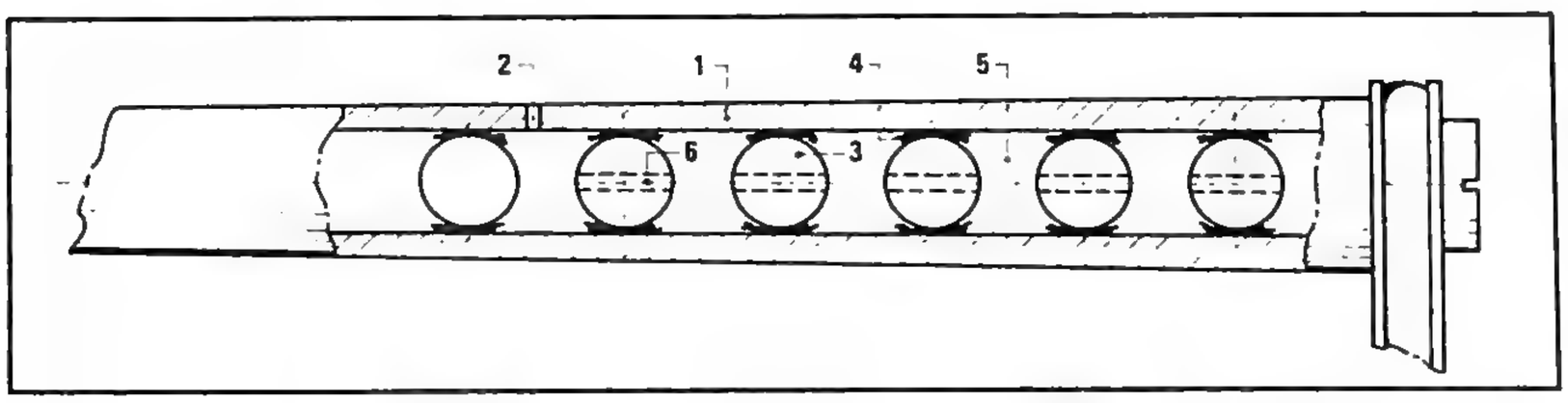


Figure 5: The first barrel: wall (1), vent (2), bullets (3), cotton rags in which the bullets are rolled (4), powder (5), hole in the bullet filled with fine powder (6). Drawing by A. F. Hoekstra, 1990.

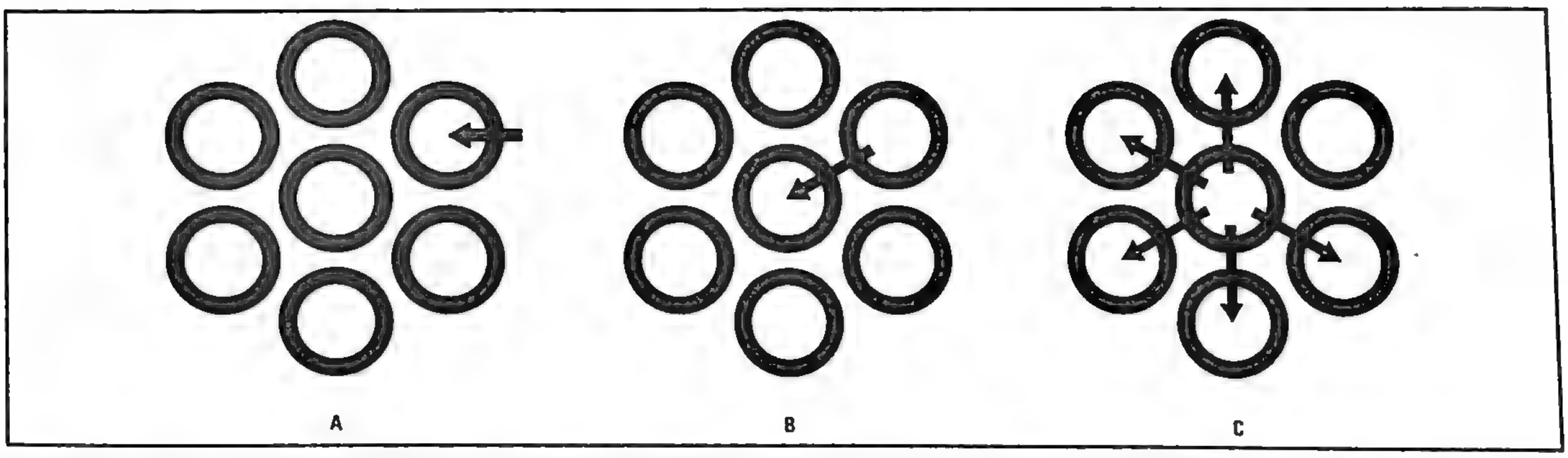


Figure 6: Firing: The spark goes into the first barrel through the vent (A), to the central barrel through the connecting channel (B), and to the other barrels (C). Drawing by A. F. Hoekstra, 1990.

Lake Ontario, the major supply route for the British troops in Canada. Although Chauncey had beaten the English on several occasions, they had not yet been driven from the lake. Because the all-important sea routes were in the hands of the enemy, supply was the major problem for the Americans, especially of heavy artillery. Their preference for lighter, more effective weapons, such as the repeating swivel, is easily understood in this context.[12]

Peace with England enabled the U.S. navy to concentrate on combating piracy in the Mediterranean. The frigate *Guerriere* of Commodore Stephen Decatur's squadron was equipped with eight swivels for this purpose. The best known action was a fight against the Algerian frigate *Mazouda* on 17 June 1815, when the Algerian commander Reis Hammida was beheaded by a ball fired from a 42-pound carronade; the use of repeating guns, however, was not mentioned.[13] Evidence confirming the presence of swivels on U.S. navy vessels in the Mediterranean has recently been found in Dutch archival sources.[14]

Although the Americans guarded the secret of the repeating guns closely, and seem to have been the only ones to have used them, the idea soon leaked out. As was mentioned before, Belton himself contacted the British in 1784. In December 1814 a man named George Hutchinson approached the British authorities offering a complete description of the swivel, which he had witnessed in action in Canada and New Orleans when he was a prisoner of war released on bail in the United States. His intentions were clearly pecuniary, but there seems to have been no follow-up. Hutchinson is not mentioned again, although the British Ordnance Department professed a keen interest and commissioned the manufacture and trial of a repeating gun on 22 May 1815. The order was retracted on 31 May, however, and the reason given was that a similar weapon had already been tested and rejected on 12 April 1779.[15] It remains unclear what gun is referred to here — prior to Belton in 1784 we have no knowledge of similar weapons in England.

There were more attempts to sell repeating guns to the British. In July 1815 John Bland, a British-Canadian from Philadelphia who had been a gunsmith for the Americans before the War of 1812, approached the Ordnance Department in a gush of patriotism with a complete description of the seven-barrelled swivel, the repeating musket, and a repeating pistol, all operating on the "Roman candle" principle. Again the British authorities rejected the offer; they judged the dangers to the ship carrying the swivel to outweigh its advantages.[16]

12. Leonard Guttridge and J. D. Smith, *The Commodores: The Drama of a Navy Under Sail* (London, 1970); S. S. Robison and M. L. Robison, *A History of Naval Tactics from 1530 to 1930: The Evolution of Tactical Maxims* (Annapolis, 1940), chapter 30.

13. Baxter, *Superimposed Load Firearms*, 211; Guttridge and Smith, *Commodores*, 278; Robison and Robison, *History of Naval Tactics*, 520.

14. Report of Vice Admiral T. F. van de Capellen on the secret loading and firing instructions of the American repeating muskets, discovered by one of his officers, R. Goteling Vinnes, 3 May 1816, N 14, ARA. See also n. 17 below.

15. Baxter, *Superimposed Load Firearms*, 306-307.

16. Blackmore, *British Military Firearms*, 250.

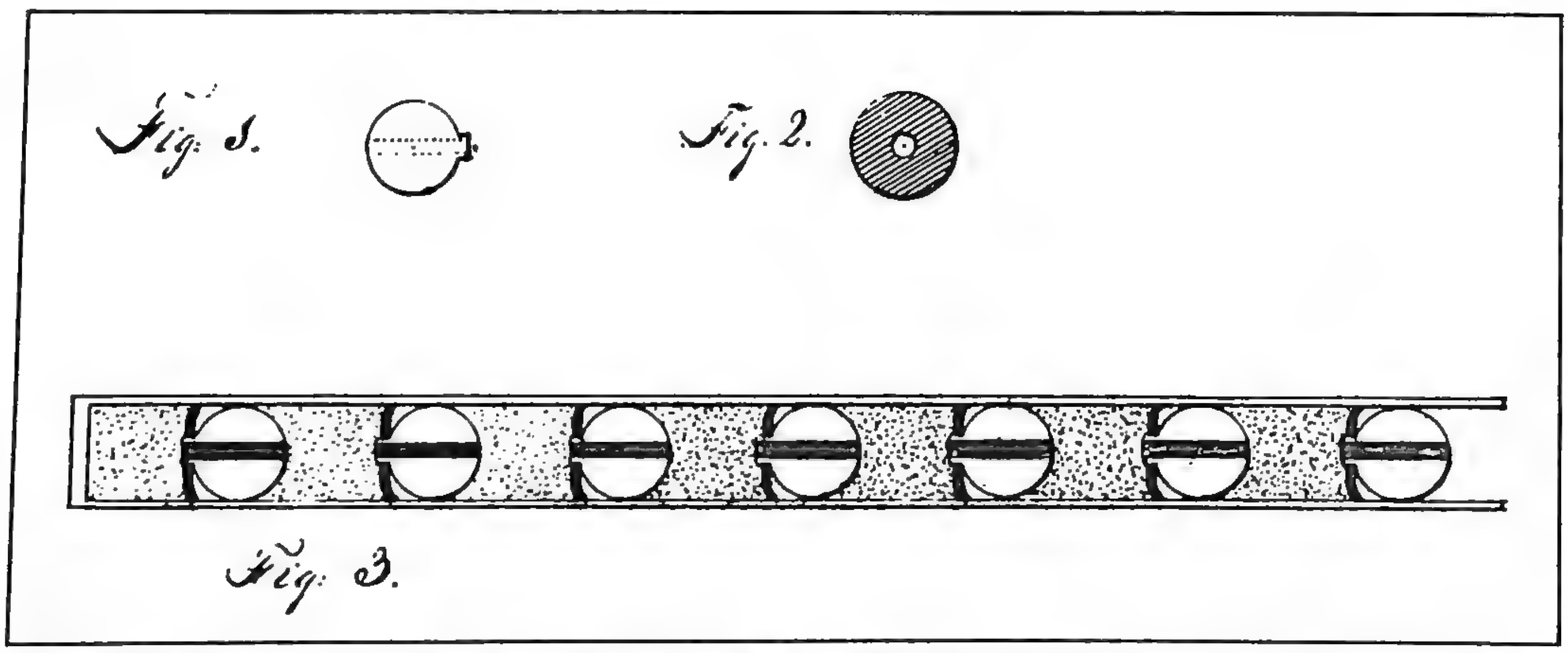


Figure 7: This drawing appeared in an appendix to a reply from the Dutch commissioner-general of war to a report by the minister of the Dutch navy, 24 May 1816, N 7, ARA. Note the small caps on the bullets that do not appear in other descriptions of "Roman candle" weapons. The reported interval between the firing of the bullets is different as well. The powder in the bullet probably contained a delay action of some sort, giving the marksman more time to take his aim. Photo courtesy of the Algemeen Rijksarchief, The Hague, the Netherlands.

The first reference to the gun by the Dutch navy is the 1816 report of R. Goteling Vinnes of the *Eendracht* stationed at Gibraltar. He had discovered the secret of handling the repeating muskets of the Americans and would soon unravel the secret of the swivel as well, as his commander informed the minister of the Dutch navy, J. C. van der Hoop. On reporting this to the commissioner-general of war, van der Hoop got the reply that these weapons had been known for several years, that experiments had been conducted on them, and that the Ministry of War was not interested because of their danger and complicated operation. However, the reply continued, the possibility of effective use of the gun on board ships could not be excluded.[17] No follow-up of this incident is known, and only a few details about the arms or trials are mentioned by the Ministry of War (see figure 7, opposite).

A few years later, the Dutch ambassador to the United States, a Mr. de Quabeck, was instructed to investigate "steamblockships" and "guns with conical chambers." On 26 December 1818, he wrote to the minister that in the course of his researches he had come upon a very interesting weapon.[18] He described it as:

> . . . une arme exessivement meurtrière et d'un effet prodigieux sur les vaisseaux, on la nomme ici "Repeating Gun." Elle consiste en une espèce de faisceau composé de douze ou plus canons, de fusils, dan chacun desquelles on met 25 charges qui au moyen d'un appareil aussis simple qu'ingénieux partent successivement les unes après les autres, laissant assez d'intervalle entre chaque de charges pour donner au pointeur le temps de changer la direction; . . . .[19]

He could procure one of the pistol-models made by the inventor, whom he does not name, if the minister so wished.[20]

Van der Hoop, who was still minister of the Dutch navy at the time, agreed. On 14 July 1820 the gun, having arrived in the Netherlands, was sent to the Department of Artillery for investigation and trial in Liège, with the intention of having it manufactured if the tests proved favorable.[21] Accompanying the gun was a manual containing instructions on the manufacture and preparation of the bullets and on loading.[22] Captain of Artillery P. Bullot, who tested the weapon in Liège, reported that at the first trial the central barrel exploded. Investigation showed that the bores seemed to be riddled with cavities and other defects and that the barrels were imperfectly joined, making it impossible to reassemble the gun once it was taken apart. Bullot replaced the barrels and improved the joinery before testing it again. This time it functioned satisfactorily, and at distances of twenty and fifty paces the spray of bullets showed little divergence. Bullot concluded that such guns could be manufactured at Liège for Dfl. 25 apiece.[23] The gun was marked on the guard-plate, and the mark was recently identified as that of J. M. Thomas, arms controller at Liège (see figure 8 above).

Figure 8: The Rijksmuseum repeating gun bears the mark of J. M. Thomas, arms controller at Liège in 1820.

17. 3 May 1816, N 14, ARA, and 24 May 1816, N 7, ARA.

18. 11 August 1818, N 17, ARA. The minister used the term "steamblockships" to refer to vessels like the USS *Demolgos*, built by Robert Fulton in New York in 1814; see also Robison and Robison. The "conical pieces" were spotted by Dutch officers in the Mediterranean on the USS *Washington* in 1816 and probably refer to Congreve ordnance with conical chambers (20 March 1819, N 10, ARA).

19. ". . . an excessively murderous weapon and of exceptional use on ships, they here call 'Repeating Gun.' It is a kind of bundle of twelve or more barrels, of guns, in each one of which 25 charges are loaded, which by means of an ingenious and simple mechanism go off in succession the one after the other, leaving enough interval for the gunman to change direction; . . . ."

20. 22 February 1819, N 20, ARA.

21. 20 March 1819, N 10, ARA.

22. 14 July 1820, N 22, ARA, and "Tabellarisch overzigt der verrigte werkzaamheden bij het wapen der Artillerie in de jaren 1819-1825," n. d., in H. J. Wolf, "Verzameling handschriften aanwezig in de Bibliotheek van de Koninklijke Militaire Academie," doc. no. 12, pp. 13-14.

23. 2 December 1820, N 10, ARA.

The Dutch navy, then, seemed all set to start producing the weapons and taking them into service. But Van der Hoop, probably uneasy because the gun was not widely accepted, sought supplemetary advice and instructed the forces in the Mediterranean to make enquiries on American ships.[24] On 14 February 1821 Rear Admiral Ruysch sent an extensive report from Port Mahon about his enquiries on the American vessel *Columbus*.[25] Ruysch was a friend of Commodore William Bainbridge, noted above for his actions in Canada, who was on his way to Constantinople on a diplomatic mission. Bainbridge expressed his surprise at the extent of the Dutch knowledge about the swivel, including its loading and handling. His own appreciation of the weapon had dwindled over time, and he was willing to tell Ruysch what he knew about its history. In 1821 the American navy did not carry swivels on its ships anymore. Bainbridge had taken one on board the *Columbus* from his former vessel, the USS *Independence*,[26] but as he lacked loading equipment and ammunition, it was never used. He also had twelve "Roman candle" muskets on board, but they were not used either because he had no trained soldiers. Bainbridge had never seen swivels with more than seven barrels and certainly not twelve as mentioned by De Quabeck. He knew that a gunsmith had tried to sell the invention to Britain but had been refused. Bainbridge agreed with the British verdict, which even seems to have influenced the American authorities in their decision to refrain from further use of the weapon. Rear Admiral Ruysch consequently advised that the swivel was unfit for the Dutch navy despite its destructive power, concluding that the gun was difficult to handle, its construction was too weak, and it was extremely dangerous for the operator and bystanders because once triggered, it would not stop, even if the gunner was out of action.

Van der Hoop decided to abandon further plans with the swivel.[27] Bullot sent the gun back to The Hague, and it was subsequently deposited in the model collection of the navy.[28]

Some questions about the Rijksmuseum swivel remain unanswered. Who was the manufacturer? The only pistol-type swivel we have encountered was the one which John Bland offered to the British. The origin of the Rijksmuseum gun is unmistakably the United States, however, and Bland had left the U.S. by the time de Quabeck acquired the gun. How much of the original design was retained after Bullot's repair and rebuilding of the Rijksmuseum swivel? Was this short-barrelled type ever used by the American navy? The only other surviving swivel, which was donated to the Musée d'Armes in Liège by an American firm in 1885, is signed by Chambers himself. The Liège weapon, described in full by Merril Lindsay in the magazine of the Musée d'Armes of 1975, is much larger, with barrels 1.52 meters long and a calibre of 1.9 centimeters.[29]

24. Ibid.

25. 8 March 1821, N 6, ARA; Guttridge and Smith, *Commodores*, 294.

26. The *Independence* was the first American ship of the line. She was Bainbridge's flagship in the actions against the Mediterranean pirates in 1815. In this famous episode Commodore Decatur, who was second in command, was sent ahead and beat the Algerians and forced the release of Christian slaves.

27. 8 March 1821, N 6, ARA.

28. 20 April 1821, N 16, ARA.

29. *Musée d'Armes de Liège, 3ème Année - No. 10*, December 1975, contains a French translation of the article by Lindsay, who studied the gun while it was on loan to the New Haven Historical Society. See also *Catalogue of the Musée d'Armes* (Liège, 1930), 362.

Commander W. G. M. H. Canisius, RNN (Ret.) is a native of Amstenrade, the Netherlands. He attributes his interest in military weaponry in part to the influence of American soldiers who liberated his hometown in September, 1944 after heavy bombardment by the Germans. "They came very often to my home," he says. "I played with their automatic guns and they took me with them in their jeep." He joined the Royal Navy in 1951, entered the Royal Naval Academy in den Helder, and was commissioned as a deck officer in 1954, after which he served on destroyers and cruisers and participated in many NATO exercises. After becoming a gunnery officer in 1962, Canisius joined the Navy Department and represented the Dutch navy on NATO panels on munitions in the 1960s. In the 1970s he taught gunnery and tactics at the Royal Naval Academy, then became Managing Director of the naval munitions stores and maintenance shop. In 1979 he was named Director of the Naval Museum in den Helder, and since leaving the navy in 1986 he has participated in a research project at the Rijksmuseum in Amsterdam to catalogue a collection of some 1,400 polytechnical naval models that were donated to the museum between 1883 and 1887. His article on the Bourbon fuse, an early percussion fuse, will appear in Tijdschrift voor zeegeschiedenis (Journal of Naval History) *in the spring of next year.*

Query and Response

Dear Editor:

In his note in *The American Neptune* 51, no. 2 (Spring 1991): 127-128, entitled "The Real *Peterhoff*," Peter Barton refers to the confusion, going back as far as 1925, regarding a steamship of this name. Some historians, Barton explains, have mistakenly stated that the Confederate blockade runner *Peterhoff*, captured by the USS *Vanderbilt* in 1863, was formerly a Russian emperor's yacht, also named *Peterhoff*. Accompanying Barton's article is an illustration of a vessel thought by some to be the blockade runner *Peterhoff*, but Barton explains that the vessel pictured, a paddle steamer, could not have been the blockade runner in question, which was a screw steamer. It seems likely, therefore, that the illustration shows the Emperor of Russia's yacht *Peterhoff*, not the blockade runner of the same name. In fact, this *Peterhoff* could never have become a blockade runner because she was wrecked on her delivery voyage in 1850.

Ordered by Nikolas I, tsar of Russia from 1825 to 1855, *Peterhoff* [1] was built in 1850 by C. J. Mare of Blackwall, London, England. She was an iron paddle steamer with one funnel and three masts, schooner-rigged, of 400 tons burthen and 140 horsepower. The source for this information, which also includes an artist's representation,[2] unfortunately does not quote her dimensions, otherwise it might have been possible to make direct comparisons with an earlier Russian vessel, *Nicolai I*, that did become a blockade runner. The earlier vessel was built at London, presumably for the Russian navy, in 1839, at a time when the Scottish captain Peter Black was Russia's naval architect. She was apparently returned to England as a prize during the Crimean War.[3] Her dimensions were 186.7 feet by 29.5 feet by 17.3 feet, 659 gross tons, 415 net tons, 250 horsepower (Lloyd's Register, 1874/5).

The imperial yacht *Peterhoff* left the Thames on her delivery voyage to Russia in October 1850 in command of James Boniland, a master with twenty-four years experience in the Baltic. Aboard the yacht were George Rennie, the engineer,[4] a Mr. Waterman, Jr., the designer of the yacht, and a Mr. Eschappar. She left Copenhagen on 22 October, but some 150 miles from St. Petersburg, a strong northerly wind drove her onto a shallow reef of rocks off an island. Leaving Eschappar in charge of the yacht, Waterman and Rennie made their way "day and night" by road to St. Petersburg to muster help, arriving late on 30 October. The journey took a great deal of time due to the atrocious condition of the roads, so to return to the scene of the disaster, they opted to wait for a steamer. Sadly, the yacht, valued at over £20,000, became a total loss, but she was insured for "a large amount." Eight to ten other vessels were lost in the extreme weather conditions in the Baltic at the time.[5]

The blockade runner *Peterhoff* was, as Barton points out, an entirely different and larger vessel, an iron screw[6] brig-rigged steamship, launched at Sunderland, England, in July 1861 by T. R. Oswald of Sunderland for Zachariah C. Pearson & Company of Hull, one of the first British companies to challenge the blockade, albeit with the disastrous results that led to the firm's bankruptcy. Pearson was a merchant, shipowner, and twice Mayor of Hull, where today a park bears his name.[7]

1. Peterhoff (or Peterhof) is the site of Peter the Great's complex of palaces and parks, the most imposing of which, his Grand Palace, he had built in 1720 to rival Versailles. It lies about twenty-five miles west of St. Petersburg on the southern shore of the Gulf of Finland. During the Communist regime it was called Petrodvorets.

2. *Illustrated London News*, 23 November 1850, 397, shows *Peterhoff* flying the old Russian Imperial Standard, the double black eagle on a yellow ground. In contrast, the illustration of *Peterhoff* in *The American Neptune* referred to in this article is flying what appears to be the old Russian navy flag, a blue diagonal cross on a white ground.

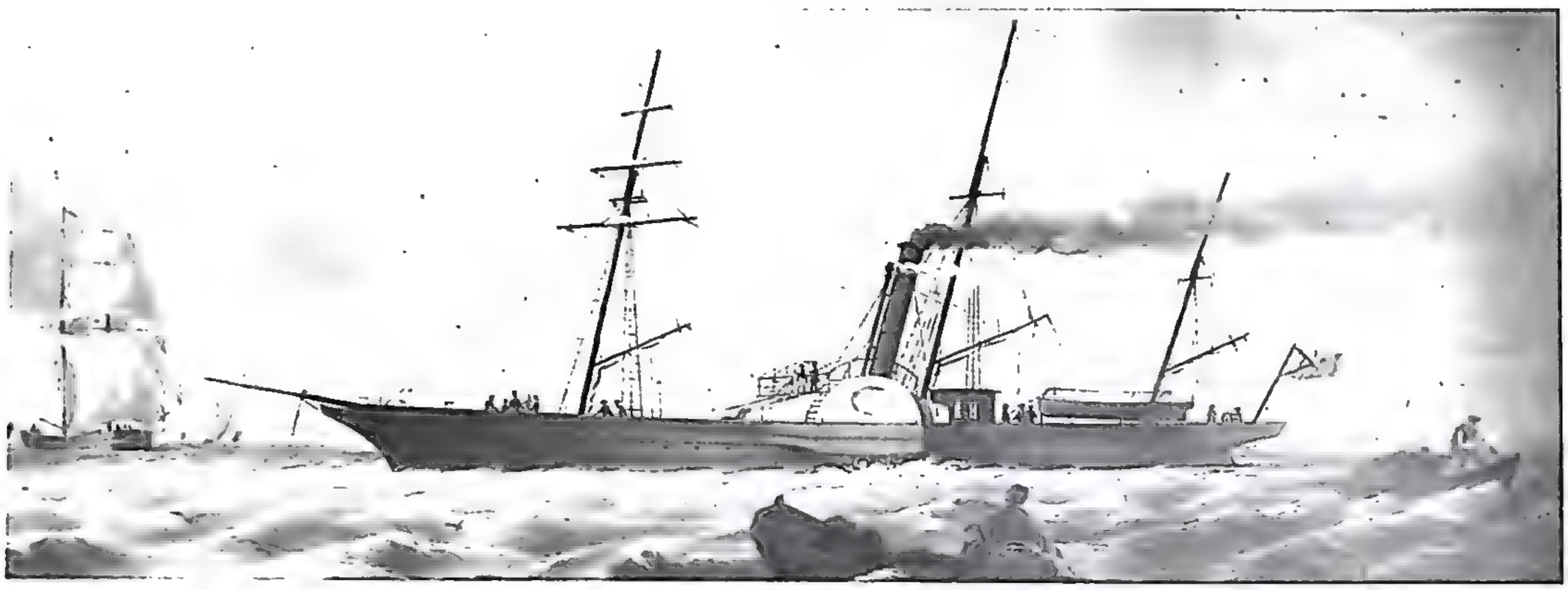
3. Stephen R. Wise, *Lifeline of the Confederacy* (Columbia, SC: University of South Carolina Press, 1988), 314, gives her dimensions as 182.4 feet by 28 feet by 17.3 feet, 536 registered tons.

4. It seems fairly certain that this George Rennie was the elder of two brothers (the younger, John, later became Sir John) who ran the famous civil engineering partnership bearing their surname. The brothers had in fact built the machinery for *Peterhoff* and for another Russian imperial yacht *Alexandrina* (see *Minutes of the Proceedings of the Institution of Civil Engineers* 28 [1868]: 613), so the presence on board of a company representative is quite appropriate. A stop-off in Sweden was another possibility, since the Rennies had carried out initial surveys in 1844 for a railway system for Sweden, which was completed in 1852 (communication from Mrs. Mary K. Murphy, ALA, Archivist of the Institution of Civil Engineers).

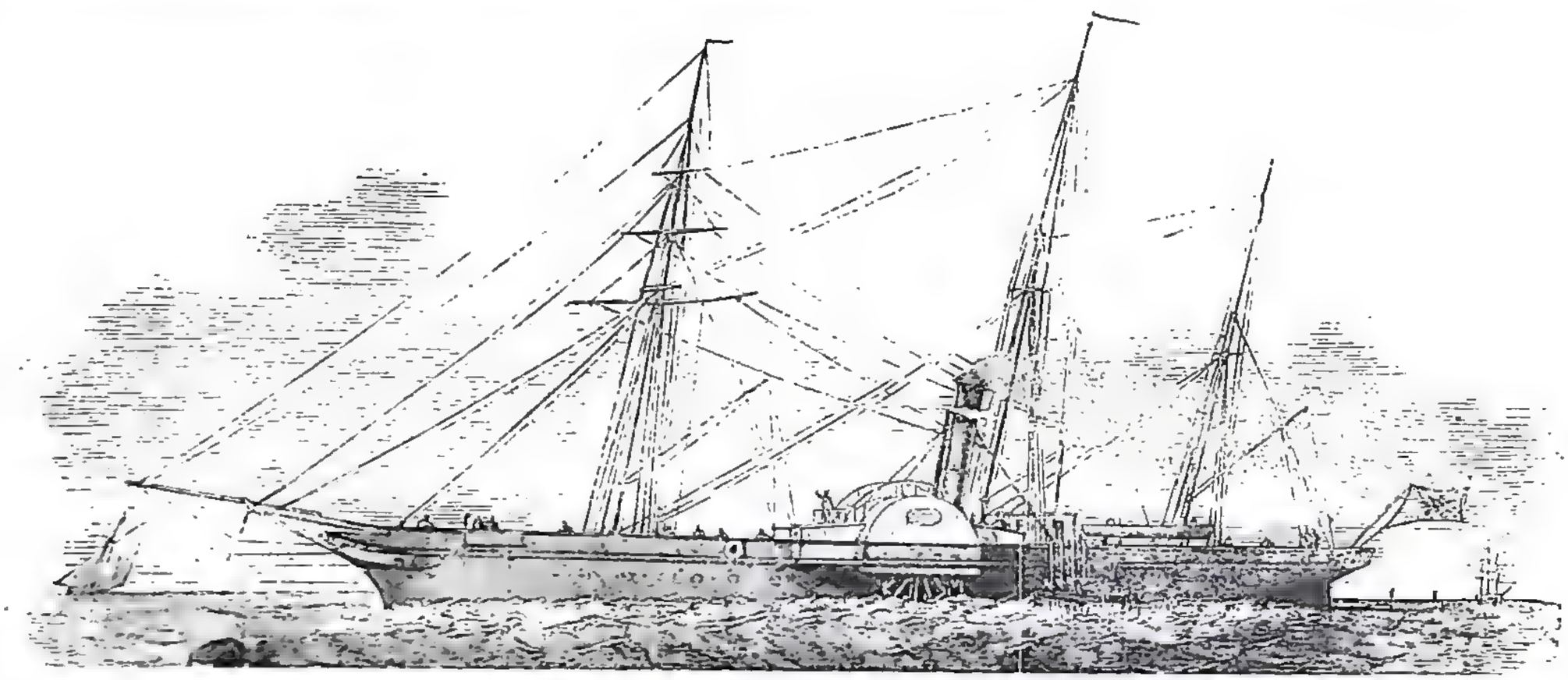
5. *Illustrated London News*, 23 November 1850, 398.

6. Wise, *Lifeline of the Confederacy*, 316, shows her as a paddle ("side-wheel") steamer and gives her dimensions as 210 feet by 28 feet by 15 feet.

7. Private communication from Mr. Arthur Credland, keeper of Maritime History, Hull Museum & Art Galleries, Hull, England.



The vessel in the photo above (courtesy of the Peabody & Essex Museum of Salem, Massachusetts), which has been incorrectly identified as the Confederate blockade runner *Peterhoff*, is most likely the imperial Russian yacht *Peterhoff*, shown in the illustration below as she appeared in the *Illustrated London News*, 23 November 1850.



In the Lloyd's Register supplement of 1862, Pearson's name as owner of this *Peterhoff* is stricken out. In the Lloyd's Register for 1863, the first year in which the larger format appeared and gave more detail, her dimensions are given as 220 feet by 29 feet by 17 feet, 819 gross tons, 669 net tons, and 90 horsepower. She is shown as belonging to Hull, although no owner's name appears, and destined from Sunderland to the Baltic under Captain G. Highly. The Baltic connection helps explain her name.

Thus, Barton states, the blockade runner *Peterhoff* was never a Russian emperor's yacht. Furthermore, the ill-fated yacht *Peterhoff* never became a blockade runner, and the illustration that has been the subject of confusion shows the yacht *Peterhoff*, not the blockade runner *Peterhoff*.

Charles Dawson
Sundbyberg, Sweden

Dear Editor:

I am a curator/conservator who specializes in maritime items. For years I have been trying to find information on the following:

Researcher requests any information regarding myths, folktales, or any related material dealing with superstitions of sailors about rooms that are not square — the belief being that a witch will not enter a room which is not square. I have seen purposely altered rooms as examples of this.

Thank you for your assistance with this long project.

Mel A. Hardin
27 Fern Avenue
Staten Island, NY 10308

News

Mystic Seaport Announces Fellowships, Librarian

The Munson Institute of American Maritime Studies at Mystic Seaport has announced the recipients of the Paul Cuffe Memorial Fellowship. The fellowship is granted annually to encourage research on the roles of blacks and Native Americans in maritime history. This year's recipients include: James C. Garman, for research on the role of African-Americans in the Newport, Rhode Island economy from 1760 to 1870; Clark Eldridge White, for work on the participation of African-American mariners in anti-slavery and underground railroad activities in New England; and the Reverend Joy Elizabeth Browne, for work on black participation in the Longshoremen's Union as well as black seafarer involvement in various independence movements. The annual application deadline for the Paul Cuffe Memorial Fellowship is 1 July. For more information, contact the Munson Institute of American Maritime Studies at Mystic Seaport, 50 Greenmanville Ave., P. O. Box 6000, Mystic, CT 06355-0990.

Paul O'Pecko has been named librarian of the G.W. Blunt White Library at Mystic Seaport. Mr. O'Pecko had been reference librarian at the library since 1984.

Brown Library Hosts Second Summer Institute

Recognizing the national need for academic support of the maritime humanities, the John Carter Brown Library announces a four-week NEH Summer Institute for college and university faculty in all humanities disciplines, and for curators of cultural/historical organizations with significant maritime collections who have substantial teaching responsibilities. The Summer Institute will concentrate on sea history, maritime trade, and naval rivalry in the seventeenth and eighteenth centuries, but the institute is intended to illuminate the full scope of issues related to nautical and oceanic affairs from the fifteenth century to the end of the Age of Sail.

Scholars accepted as participants in the institute will receive a subsidy for round-trip travel to Providence and a stipend of $1,000 in addition to room and board for the four weeks. For further information, please contact the Maritime Institute, John Carter Brown Library, Box 1894, Providence, RI 02912. The deadline for applications is 1 March 1993.

Historical Archaeology Publishes Underwater Issue

The Society for Historical Archaeology announces the publication of a special issue of the journal entitled *Advances in Underwater Archaeology*. Volume 26, number 4 of *Historical Archaeology* is a collection of fifteen articles on topics such as the USS *Monitor* and the Yorktown wrecks, cultural resource management, high technology applications such as sophisticated ROVs and photogrammetry, and the ethical conflicts and tragedies of treasure hunting. An interesting and important contribution is the set of articles on replication and experimental archaeology. Single issues are available for $12.50 each plus $1.75 postage from the SHA, P.O. Box 30446, Tucson, AZ 85751-0446.

Ship Modeling, Maritime Arts Festival Planned

A festival featuring model shipbuilding and maritime arts will be held this spring in the historic town of Easton, on Maryland's eastern shore. The Mid Atlantic Maritime Festival will take place from 30 April through 2 May 1993. The festival will feature an exhibit of ship models, marine paintings and prints, maritime photography, and nautical antiques and crafts. Demonstrations of ship model building and radio controlled models are also planned. Those interested in exhibiting models, kits, or supplies should contact the Ship Model Chairman at (410) 745-3525; for other information call (410) 822-2866.

NASOH, CAMM Plan Joint Meeting in Bermuda

The Bermuda Maritime Museum will host the 1993 annual meetings of the North American Society for Oceanic History and the Council of American Maritime Museums, to be held jointly on 17-20 March 1993. The conference theme is "Underwater Archaeology, Maritime History, and Museums," and the papers presented will explore the problems and opportunities afforded by the interaction of these three subjects. For information contact the Bermuda Maritime Museum, P. O. Box MA 273, Mangrove Bay, Sandys, MABX, Bermuda, (809) 234-1333 or fax (809) 234-1735.

Book Reviews

WILLIAM J. WILLIAMS, *The Wilson Administration and the Shipbuilding Crisis of 1917: Steel Ships and Wooden Steamers* (Lewiston, New York: Edwin Mellen Press, 1992). Iv + 220 pages. $69.95. ISBN 0-7734-9492-8.

In 1917, losses of merchant ships to German submarines far outstripped new construction. In the absence of an effective antidote to submarine attacks, the only way in which the transatlantic supply of goods vital to the Allied cause could be maintained was to increase greatly and rapidly the building of merchant vessels. The United States, however, lacked building slips, steel, and skilled workers in the quantity necessary to increase the production of conventional steamships to the degree that circumstances seemed to require. William Denman, the chairman of the Shipping Board, which was responsible for the national shipbuilding effort, was convinced that a large fleet of wooden steamers could be built using less scarce plant, lumber, and unskilled workers. The scheme was opposed, however, by George Goethals, the famous engineer whom Denman had appointed to carry out the task of shipbuilding as head of the Emergency Fleet Corporation. A bitter power struggle between Denman and Goethals during the spring of 1917 resulted in the resignations of both men by midyear and caused delays in the American shipbuilding effort that might have had dire consequences, had not the adoption of convoy mitigated the effects of the German underwater campaign.

The Wilson Administration and the Shipbuilding Crisis of 1917 is a detailed account of the Denman-Goethals controversy, based primarily upon a thorough examination of the papers of the participants. Its chapters cover the American shipbuilding industry before the First World War, the growth of American commercial shipbuilding between August 1914 and January 1917, the creation of the Shipping Board and the beginnings of the wooden shipbuilding program (January-April 1917), the debate over the practicability of wooden ships (April-June 1917), the struggle for power at the Emergency Fleet Corporation (June-July 1917), and a short epilogue and summing up. Williams concludes that Goethals' program of building mostly steel ships was sound and his concern for quick action correct, that Denman made "some good decisions" with respect to the choice of a wooden ship design and the construction of diesel-powered vessels, and that while the approaches of both men to the problem of shipbuilding were not incompatible, personality differences made cooperation impossible.

The story of the wooden shipbuilding fiasco was told briefly in Jeffrey Safford's *Wilsonian Maritime Diplomacy 1913-1921* (Rutgers, 1978, pp. 95-104). By devoting an entire monograph to the incident, Williams is able to add a good deal to our understanding of a significant subject. The failures of the wooden shipbuilding program reveal much about the difficulties and perils of wartime industrial mobilization, the peculiarities of American domestic politics and their impact on military performance, and the often critical influence of personality on the outcome of important events. The virtues of Williams's close-up focus are shown to particular advantage in his discussion of the maneuvering of Goethals into service with the Shipping Board (pp. 75-80), the vicissitudes of negotiating lumber prices (pp. 112, 151-3), and Wilson's perhaps too skillful by half management of Denman and Goethals (especially pp. 160-3).

The main weakness of the book is the sketchy treatment of technical matters — more could and should have been said about the shortcomings and relative merits of the various wooden ship designs, none of which are fully described or illustrated. Regrettably, four pages of the review copy were so badly misprinted as to be illegible (pp. 41-2, 167-8). Furthermore, Williams's concluding balanced evaluation of Goethals and Denman, on the strength of his own presentation of their merits and faults, seems overly judicious. Goethals was authoritarian, but Denman forced him into a job that he did not want, and after accepting it out of a sense of duty, he came up with what was very substantially the correct solution, which Denman contested. The personality conflict between Denman and Goethals was important, but so was the policy disagreement, the late convergence of their programs notwithstanding. Williams's monograph is, all the same, a worthy study — on the whole well-written, sensibly organized, carefully researched, and plausibly argued.

Jon Tetsuro Sumida

University of Maryland

ANDREW LAMBERT, *The Last Sailing Battlefleet: Maintaining Naval Mastery 1815-1850* (London: Conway Maritime Press Ltd., 1991). 9½" x 11½", x + 214 pages, illustrations, maps, appendix, bibliography, notes, index. £35.

Nearly ten years after Trafalgar, Napoleon was defeated at the battle of Leipzig on 16-18 October 1813. A year later, the Congress of Vienna set the stage for the second Treaty of Paris, signed in November 1815. Revulsion against the heavy casualties of the far-flung battlefields, onto which the nations had committed so many thousands to death, famine, and disease, was widespread. Therefore, Europe's conservative reaction to the devastation caused by the French Revolution and Napoleonic Wars was a desire to re-establish and maintain peace. The postwar period began within the framework of French boundaries set at their 1791-92 limits.

Andrew Lambert, British naval historian and Lecturer in the Department of War Studies, Kings College, London, has placed the Royal Navy's final sailing fleet within the framework of contemporary diplomatic considerations, strategy, and ship design, construction, and maintenance. *The Last Sailing Battlefleet: Maintaining Naval Mastery 1815-1850* covers that period often described as "Pax Britannica."

Lambert's treatise revolves around Britain's postwar objectives: to maintain mastery of the seas in order to protect her trade and the mercantile needs of her empire, and to sustain the defense of the home isles. Britain had adhered to a policy of coalition warfare during the latter years of the Napoleonic Wars; by 1815 it had accepted, under Lord Castlereagh, a major role in continental European affairs. One example was her participation in the neutralization of Antwerp. Lambert points out that a result of this new policy was a "two-power naval standard": the active and reserve Royal Navy were to be superior to any European two-power combination. The use of a substantial reserve force was of high priority.

Lambert's effort is a detailed accounting of how the Royal Navy attained these objectives in spite of postwar retrenchment. The author introduces readers to known and unknown British political and naval leaders, giving comprehensive and thoroughly documented background information. British postwar naval policy set the number of ships of the line at 100; frigates would total 160. American readers will be surprised at these numbers but should realize that, by 1814, the Royal Navy was confronted not only with the concluding years of the Napoleonic Wars but also with the challenge of the small American fleet of large frigates.

In the Royal Navy's structured shipbuilding program, two names stand out: Sir Robert Seppings and Captain Sir William Symonds. One other name will be familiar to American readers: Captain Philip Broke of *Shannon* fame.

During Robert Seppings's career as Surveyor of the Navy (1815-1831), his efforts to solve the structural weaknesses of warships became well known on both sides of the Atlantic. His use of diagonal hull timbers and bracings between the gunports was notable for attempting to reduce "hogging" of the hull as well as providing more internal storage space within the hull. His work with the rounded stern was aimed at correcting what he thought was the most vulnerable part of the hull structure. Lambert makes the point that Seppings's knowledge of shipbuilding and related flaws included the concept that the entire ship be considered as an integral structure, with each segment dependent upon all the others.

Sir William Symonds served as the next Surveyor, beginning in June 1832. During his term, which lasted until 1847, the Royal Navy's gunnery received considerable attention and improvement. His efforts resulted in heavier and longer-range guns. Sighting was also improved, as was training of gun crews. His ships carried fewer guns, but those carried were of extended range and greater accuracy. To accommodate these improvements, Symonds's ships were much larger. For example, the width of gun decks was expanded to allow full recoil of the guns. The combination of improvements in ships and in their quality of armament continued England's mastery of the seas.

Lambert also re-introduces Philip Broke to American readers. Broke is known for his training of the frigate *Shannon*'s gun crews and for the loss of America's *Chesapeake* in 1813. Broke's concepts of training, drilling, and live-firing were eventually to combine with the lessons learned from the successful American frigate actions during the War of 1812. The large American frigates carried 24-pounders compared to the British use of 18-pounders, and most were served well by intensive gunnery drills. The British had adopted Lord Nelson's doctrine of close-range volume fire. The postwar Royal Navy, as the period progressed, worked diligently to attain higher standards than that of Nelson's era.

The author also describes British efforts to introduce proper methods of timber procurement and storage prior to construction and repair. By husbanding and carefully allocating resources within the confines of improved shipyard management, the British produced ships of consistently superior quality. During a ship's overhaul, the work would entail upgrading the ship to then current standards.

The book is substantial in size: 9½ by 11½ inches, with numerous illustrations and photographs. The small print size does make reading somewhat difficult, however, and readers familiar with Conway Maritime Press's

Anatomy of a Ship series will not find the detailed drawings found in that series. Unfortunately, there are no in-depth drawings which detail the contributions of Seppings, Symonds, and others.

In 1984 Conway Maritime Press published Andrew Lambert's *Battleships in Transition: The Creation of the Steam Battlefleet 1815-1860*. In this book, Lambert has returned to that same period to put forth his thesis that the Age of Sail did not end at Trafalgar but was to continue far into the nineteenth century. It continued until several key elements — the fitting of steam power to the screw propeller, the establishment of overseas coaling stations, the development of armor, and the introduction of shell-firing cannon — had combined to bring on the Age of Steam. Andrew Lambert has stated his case well.

RICHARD EDDY

Tallahassee, Florida

CHESTER G. HEARN, *Gray Raiders of the Sea: How Eight Confederate Warships Destroyed the Union's High Seas Commerce* (Camden, ME: International Marine Publishing, 1992). Xv + 351 pages, illustrations. $24.95.

During a four-year period from June of 1861 to 28 June 1865, 181 Union vessels — merchant and whaling ships, fishing schooners, two pilot boats, a U.S. revenue cutter, and a U.S. warship — were destroyed by eight Confederate commerce raiders. In addition, of 51 other vessels captured and released, 40 were bonded. As a result, hundreds of ship owners either sold or transferred their vessels to foreign registries, resulting in a grand total of more than 900,000 tons of shipping lost to the United States. This was more than half of the country's entire merchant fleet! No small accomplishment for a new nation that initially possessed no navy at all.

Although the United States itself practiced commerce raiding in its earlier wars, the Lincoln administration's refusal to recognize the Confederacy placed the South's raiders on a par with pirates. U.S. Navy Secretary Gideon Welles was determined to rid the seas of these "pirates," but he would not weaken the blockade to accomplish this. The captains of the raiders were in a paradoxical position. Although they commanded Confederate "warships," their vessels were never intended for combat. Moreover, they were too valuable to risk losing, and their captains were under strict orders to avoid encounters with federal warships. Nevertheless, a brash Captain Raphael Semmes engaged the CSS *Alabama* with one U.S. warship and sank her, but he later lost his ship to a far more powerful adversary. In spite of this loss, Semmes became the only captain of a Confederate raider to be promoted to admiral. His one ship alone was responsible for sixty-six captures, the highest record of any Confederate raider.

The remarkable story of the raiders has been told before, initially in the postwar memoirs of Semmes and other Confederate naval officers and in histories by J. Thomas Scharf and James R. Soley. Publication of volumes 1, 2 and 3 in series 1 of the *Official Records of the Union and Confederate Navies* (1894-1896) made available official reports and even the logs and journals from six of the eight raiders. These and other sources were used by George W. Dalzell in his *The Flight from the Flag: The Continuing Effect of the Civil War upon the American Carrying Trade* (1940), a work devoted exclusively to the history of the Confederate commerce raiders. Alarmed at the state of world affairs in 1940, Dalzell contended that the U.S. merchant fleet had never recovered the position it had once held in world trade before the Civil War. To Dalzell, this calamity required emergency measures lest the U.S. further decline as a maritime power. In *Gray Raiders*, author Hearn retells Dalzell's account of how this situation came about.

Three of the eight Confederate raiders — *Florida*, *Alabama*, and *Shenandoah* — are already the well-known subjects of numerous books and articles. Their captains — John N. Maffitt, Semmes, and James I. Waddell — have become as famous as the ships they commanded. Others are not so familiar. The *Sumter*, the first of the South's commerce raiders, had only limited success as a raider. The *Nashville* and the *Georgia*, also with few prizes, were commanded by officers less colorful and controversial than Semmes and Maffitt. The *Chickamauga* and the *Tallahassee*, which operated out of Wilmington, North Carolina, during 1864, proved more useful as blockade runners. Two other prospective raiders came to nothing: the *Alexandra*, which was seized by English authorities before she could leave that country, and the *Rappahannock*, which left England in such a state of disrepair that she spent the rest of the war in drydock at Calais.

The key figure behind the best known of the raiders was Commander James D. Bulloch, Confederate naval agent in England. Without Bulloch there would have been no *Florida*, *Alabama*, or *Shenandoah*, and that touches on only a part of his service to the Southern cause. This dedicated and resourceful officer was originally promised the command of either the *Florida* or *Alabama*, but he proved so indispensable that Confederate Navy Secretary Stephen R. Mallory ordered him to remain in England. As a result, Bulloch has remained a little-known figure compared with other Confederate naval officers. *Gray Raiders* helps to draw attention to the vital role that Bulloch played as a secret agent. No account of the raiders is complete without him.

Although *Gray Raiders* includes much action and heroics, it also recounts the disappointment and frustration endured by raider commanders: their inability to bring prizes into any Southern port; the often frosty reception of officials in foreign ports (although there were exceptions to this); the unruliness of foreign mercenary crews; and anger at the reports about them published in the Northern press. Little wonder that Semmes seized the opportunity to engage the USS *Kearsarge* before relinquishing command of the *Alabama*. He showed his enemies that he was no coward, no "pirate," as they charged, but by doing so he became the victim of his own hubris.

Hearn has utilized the standard sources already mentioned, but he has largely neglected more recent material on the raiders. He bypasses several important manuscript collections, unpublished dissertations, and journal articles. This will disappoint the serious student and specialist but not the general reader. The book has no bibliography, although Hearn does provide commentaries for sources in his footnotes. Considering the overall quality of *Gray Raiders*, Hearn must be forgiven the occasional slip, such as his statement that Semmes was warned by one of his own officers that the *Kearsarge* was protected with chains slung over her middle. (These were covered over with boards.) According to Lieutenant Arthur Sinclair of the *Alabama*, writing in 1896, it was the French admiral at Cherbourg who informed Semmes of the chain protection shortly before the battle. Hearn shows no inclination to become involved in this and other controversies concerning the raiders and their captains.

Such points are unlikely to trouble most readers of *Gray Raiders*. The book is well written and tells a story that deserves retelling. Eighty-seven well-chosen illustrations of ships, charts, and personae, both Union and Confederate, enhance its attractive format, and an appendix listing all 237 vessels sunk or released by the raiders is also useful. *Gray Raiders* should be added to every collection of Civil War and naval histories.

NORMAN C. DELANEY

Del Mar College

JERRY O. POTTER, *The* Sultana *Tragedy: America's Greatest Maritime Disaster* (Gretna, LA: Pelican Publishing Company, 1992). 9¼" x 6½", cloth, xii + 300 pages, illustrations, appendix, bibliography, index.

On the night of 14 April 1912, the *Titanic*, at 882 feet overall the mightiest liner of her day, carried 2,227 crew and passengers, many of the latter in great luxury. On the night of 27 April 1865, the *Sultana*, a Mississippi steamboat at 260 feet overall, carried 2,400 crew and passengers, most packed aboard like cattle. When the *Titanic* was lost to an iceberg, 1,552 people perished, and her story is retold by novelists, film makers and historians. When the *Sultana* was lost to exploding boilers, over 1,700 people perished, yet no novels, no films, and only a few histories recount her demise.

In this volume, Jerry O. Potter seeks to recount the story of America's worst maritime disaster. Potter, trained in the law, is also concerned with "the irresponsible conduct and criminal negligence" of those military personnel and civilians who so overloaded the *Sultana*, whose legal capacity was but 376 people (pp. 3-4). Even more tragically, most of those who died were enfeebled former Union prisoners of war, homeward bound from Confederate prison camps at Andersonville and Cahaba.

The author first describes earlier captures of some of the soldiers and the deplorable conditions of their captivity. He then turns to Vicksburg, the Union station where exchanged Yankees were collected for shipment north. Even before the *Sultana* affair, two of the officers stationed there had been spared dismissal from the service only through the intervention of Ulysses S. Grant and Abraham Lincoln. Potter's story becomes a tragic tale of possible collusion between the military and riverboat agents, who decided on which steamers the freed soldiers would be shipped; wrong calculations, further helping to insure that the *Sultana* would carry six times her passenger quota; and a bargain struck between the boat's officers and a boilermaker merely to patch a defective boiler.

Thus, in the fashion once popularized by Walter Lord, Potter portrays events as moving inexorably toward their ghastly denouement. His description of the explosion and its awful consequences, again like Lord's of the *Titanic*'s end, draws on letters, newspapers, and memoirs to present a moment-by-moment chronicle of the fates of passengers and crew: panic and heroism, instant and unspeakable deaths, seemingly miraculous salvations, pilfered bodies, and succor for survivors — Potter describes them all.

Not surprisingly, subsequent military investigations selected a single scapegoat of nominal rank for court-martial. Dishonorable discharge was the verdict, but the army's judge advocate general overturned the decision on remarkably specious grounds. So even Captain Frederic Speed was honorably mustered out to the prosperous life of a Mississippi carpetbagger. (The author's disgust is not lost on the reader.) The penultimate chapter evaluates culpability for the *Sultana*'s overburdening and her patched boiler. Potter closes his history with a plausible explanation of why this tragedy, unlike the *Titanic*'s, was soon forgotten: its proximity to other momentous events, such as the war's end and Lincoln's assassination; the public's wartime inurement to death; the accident's being "far removed" from big eastern newspapers; and the fact that most of its victims "were enlisted men — not colonels

or generals" (p. 186). An appendix provides a painstakingly prepared (with Gene Salecker) list of names of the *Sultana*'s crew and passengers.

Writing this work was obviously a labor of dedication, and much of the narrative and analysis is compelling. It seems a shame to point out some lapses in content and editing. For example, the Civil War did not end at Appomattox (p. 23). Confederates under Johnston, Taylor, and Kirby Smith were still in the field, and, indeed, under Taylor and Smith even after the *Sultana*'s destruction (p. 185). Also, there is some repetitiveness (e.g., pp. 136, 139, 163, 175). The chapter on prisons and prisoners leaves unclear the criteria for selecting a few captures of Yankees for description, and in equating the respective deleterious effects of Cahaba and Andersonville, it contradicts proffered evidence (p. 22) and William Bryant's recent study of Cahaba. One may also wonder why, in describing the culprits at Vicksburg, Potter devotes three pages to Captain Williams and only two paragraphs to Captain Speed, when Speed seems the more central protagonist.

The narrative of the *Sultana*'s last trip is generally engrossing. Unfortunately, questions about details sometimes intrude. For example, were Young and Clancy on the main or boiler deck (pp. 79, 91)? Was the texas cabin "gone" (p. 87) or still there (p. 105)? Could the *Sultana*'s bow, which was engulfed in flames within twenty minutes and soon "disappeared altogether" with five hundred men (pp. 91-92, 95), provide shelter for twenty-five men five hours later (p. 114)? Did the *Bostonia* lower a single yawl (p. 107) or several lifeboats (p. 108)? When witnesses disagree, the historian acknowledges the point and gets on with reconciling the contradictory testimony. Two other questions also seem germane: Shouldn't vessel types be identified when the craft are first mentioned (pp. 108, 112), and was Durkin's given name William (p. 115) or Thomas (p. 197)? These matters, taken individually, are quibbles, but their cumulative effect is to distract the reader from the dramatic narrative.

Fortunately, Potter's later chapters avoid such distractions. They are well studied and documented, though endnote 41 should cite Bruce Catton, and the title of the naval records in endnote 15 is inaccurate. There is a question, however, whether in his rush to judge Vicksburg offenders, Potter undervalues evidence, stressed by historians Bryant, Frederick Way, Jr., and James Elliott, that the *Sultana*'s firetube boilers may have exploded because a flooded Mississippi clogged them with mud. If this volume goes into a second edition, such problems will no doubt be addressed and the author's objectives will be even more fully realized.

JOHN D. MILLIGAN

State University of New York at Buffalo

ROBERT ERWIN JOHNSON, *Bering Sea Escort: Life Aboard a Coast Guard Cutter in World War II* (Annapolis: Naval Institute Press, 1992). 126 pages, illustrations, index. $19.95.

Robert Erwin Johnson was a young Coast Guard recruit when he was assigned to the cutter *Haida* in 1941 not long before Pearl Harbor, and this book is a memoir of his days aboard the *Haida Maru* until he was reassigned in the spring of 1944. Using the vessel's logs and "war diaries" (or service record), as well as letters to his parents, to augment his own memory, Johnson has produced an interesting tale of the war at sea. It is true that his service was aboard "an obsolete cutter in a relatively unimportant theater of operations" (p. 81), and the vessel's conflict with the enemy amounted to little more than unconfirmed sonar contacts here and there. Duty aboard the *Haida* meant short convoys and patrols (seldom more than four days at sea), mostly in the Gulf of Alaska, with frequent liberty, for what it was worth, at Juneau or Kodiak. For the young quartermaster, however, the duty could be challenging, particularly in dangerous waters in difficult fog or snow conditions in a vessel without radar. For Johnson, the most trying duty was as a sonar operator — serving four hours of watch held prisoner by pinging earphones. The view of life aboard such a ship, however, is interesting indeed; Johnson is charitable to most of his superiors and shipmates, but it is clear that part of his time aboard the *Haida* was under a very idiosyncratic master, to say the least, making the *Haida* rather like the *Caine*, though without either yellow dye or strawberries.

Johnson was in many ways a typical young warrior, eager to learn but not to draw uncomfortable duty, wishing to do his part in the war but rightly nervous about *Haida*'s ability to deal with a Japanese submarine or air attack — and meanwhile slowly climbing the ladder to watchkeeper on the bridge. In other ways, Johnson was rather untypical; what young seaman subscribes to the *Proceedings* of the Naval Institute and lavishes $21 (of $88 monthly pay) on a copy of *Jane's* for 1941, hauling that invaluable reference work around in his sea bag when it was not being borrowed by the officers? Johnson, in short, was hooked on things naval, particularly naval history. That *Bering Sea Escort* reads far more smoothly than the average memoir is no surprise, once it becomes clear that Johnson went on to college at Oregon and earned a Ph.D. at Claremont. Now professor of history at the University of Alabama, he is the author of numerous books and articles, including *Guardians of the Sea: A History of the U.S. Coast Guard, 1915 to the Present* and *Thence Round Cape Horn: The Story of U.S. Naval Forces on Pacific Station, 1818-1923*. The result, overall, is a valuable memoir by a professional historian with a keen eye for

what is interesting and important. Not only does this short book fill another corner of the social and naval history of World War II, it is readable and entertaining as well.

BRITON C. BUSCH

Colgate University

THEODORE TAYLOR, *The Magnificent Mitscher* (Annapolis: Naval Institute Press, 1991). Xxxiii + 364 pages, illustrations, bibliography, index. $26.95. ISBN 1-55750-800-3.

Marc A. "Pete" Mitscher *was* a magnificent World War II American naval leader. Ever since that conflict, lay people who hear or read his name often confuse it with James Michener, the author. Mitscher was a businesslike, professional sailor-airman who cared not a lick if the public knew of his exploits. But to the men who had served under his command in the sprawling Task Force 58 which had destroyed the Japanese naval air force and spearheaded the Pacific offensive of 1944-45, Mitscher was a peerless leader who deserved credit and recognition — and a good biography — after the exhausted warrior died on active duty in 1947.

Mitscher got the biography in this excellent treatment by young journalist and wartime merchant and naval officer Theodore Taylor in 1954. At the time, Taylor interviewed many of the key individuals close to Mitscher throughout the early years of naval aviation when events were fresh in their memories. In the intervening years, a few nuggets of the great admiral's life have surfaced, especially in oral histories, but Mitscher seems to have destroyed his own record, leaving historians with about as good a biography as will probably ever be written about him. Jeffrey G. Barlow has written a useful introduction to this reprinted edition, but one wishes he had obtained a few more details by interviewing, in addition to Admiral Arleigh Burke, some of Mitscher's other surviving wartime staff officers, notably Supreme Court Justice Byron White and TF 58's superb "weatherguesser" James J. Vonk.

A small, wizened man who balded prematurely, Mitscher was turned back two years at the Naval Academy, to the class of 1910, for hazing. He served in the usual post-graduation seagoing billets — in gunboats, destroyers, and armored cruisers — and entered naval aviation in 1915. He commanded three World War I expansion naval air stations in rapid succession and piloted Pat Bellinger's NC-1 in the first transatlantic flying expedition in 1919. Mitscher proved skillful in the cockpit and as an air racer, but he made his greatest interwar contributions in helping to develop the aircraft carriers *Langley* and *Saratoga* into offensive weapons systems and doing much the same for patrol aviation during the 1930s.

He brought the carrier *Hornet* into commission as her captain in time to launch Jimmy Doolittle's B-25 army bombers against Tokyo in April 1942 and to fight the Battle of Midway two months later. As rear admiral, he successfully commanded Allied air forces in the Guadalcanal and Solomon Islands campaigns until mid-1943. His crowning achievement, however, was as vice admiral wielding the new Fast Carrier Task Force (TF 58/38) as the most powerful offensive fleet in history, its aircraft and guns destroying Japanese air defenses in the Marshalls, Truk, Marianas (at the "Turkey Shoot"), the Carolines, and the Philippines during 1944. After a short respite ashore, during 1945 he led the fast carriers again in the Iwo Jima and Okinawa campaigns, striking targets in the Japanese home islands as well. Given his fourth star as full admiral after the war, he commanded the Atlantic fleet briefly until his death.

Historians of the past four decades have simply, and correctly, echoed biographer Taylor's handsome tribute to this great man; for a recent appraisal of Mitscher, see this reviewer's chapter on him in Stephen Howarth, ed., *Men of War: Great Naval Leaders of World War Two* (1992).

CLARK G. REYNOLDS

College of Charleston

FRANK O. BRAYNARD, *U.S. Steamships: A Picture Postcard History* (Vestal, NY: Almar Press, 1991). 8½" x 11", paper, 144 pages, 228 illustrations, bibliography, index. $14.95 plus $2.95 postage and handling.

It has on occasion been stated that America's major contribution to western civilization was the application of steam power to ships. Those who believe this will be fascinated by Frank O. Braynard's unique look at the history of American steamships from the late eighteenth century to today. The much-honored Braynard is currently the curator of the American Merchant Marine Museum and has written and illustrated more than twenty books and magazine articles on the maritime industry. His new book is a satisfying visual journey into the history of U.S. steamships and American maritime enterprise.

Using picture postcards, Braynard presents a selected chronological history of U.S. steamships. The book is lavishly illustrated with black-and-white photographs and drawings of seven different categories of American steamships: deep sea, coastal, Great Lakes, inland waterways, propeller-driven, paddle wheel, and combination of paddle wheel and sail. Informative captions give historical background and technical information on the steamship

shown on the postcards. Whenever possible, Braynard includes some anecdotal material about the ship and the people associated with its development. Whenever such data are available, the captions include the publisher, manufacturer, and type of postcard, the postmark, and a value index of the postcard.

This book will give readers a wonderful glimpse of the past, and particularly of the years between the Civil War and World War II. Its text is alive with the lore and romance of early steamboating. Braynard's knowledge of naval architecture and marine engineering is impressive, as is his ability to trace successfully the multiple careers and name changes of many of these ships. A few historical errors have slipped into the text — for example, the author refers to North and South Dakota as territories in 1904 when they had been states since 1889 (p. 41), and Grover Cleveland was not yet president or married when he helped christen the American Line's new ocean liner *St. Louis* on 12 November 1884 (p. 23) — but none of them involve Braynard's knowledge of the ships themselves. Such minor errors do nothing to detract from the book's rich historical evocation of an era when coastal, river, and Great Lakes steamers were a vital part of everyday life in America.

GERARD A. FORLENZA, JR.

Claremont, California

T. LINDSAY BAKER, *Lighthouses of Texas* (College Station, TX: Texas A&M University Press, 1991). 11½" x 11½", cloth, xv + 128 pages, 17 black-and-white photos, 12 color plates, line drawings, bibliography, index.

Lighthouse books generally fall into two categories. The works of Edgar Rowe Snow typify those that are long on lore and short on fact, appealing largely to readers with a folkloric or nostalgic interest in lighthouses. But while that author — whose romance with lighthouses included his self-created role of "the lighthouse Santa," dropping presents to keepers' families on his yuletide flights — may be excused for a carelessness with facts, contemporary writers who perpetuate such inaccuracies are less pardonable.

Lighthouses of Texas, by T. Lindsay Baker, is a fine contribution to the other, scholarly tradition of lighthouse books. Baker's credentials for the task are unassailable: an engineer, he once documented Texas lights for the Historic Engineering Record of the U.S. Department of the Interior and later produced *Building the Lone Star: An Illustrated Guide to Historic Sites.* Texas A&M University Press approached him to do a book on the lighthouses of the Texas Gulf Coast, and this work is the result. His detailed histories of Texas's ten surviving lighthouses (of a total of twenty-four) and two lightships are based on painstaking research which included visits to the National Archives in Washington, D.C. and repositories along the Texas Gulf Coast. Adding to the interest of *Lighthouses of Texas* are historical photographs from the National Archives and twelve watercolors by artist Harold Phenix of the featured light stations as they appeared while in service.

In many ways, the history of Texas lights parallels that of the country's lights in general, yet the extremities of climate and geography in Texas created special versions of difficulties encountered elsewhere. In swampy areas, bugs could be thick enough to obscure the beacons. On one night in 1918, the keeper of the Matagorda light reported that he had to remove insects by the shovelful from the lantern room. Malaria and yellow fever were also threats. Great distances exacerbated the usual problems of inadequate transportation: a keeper at Matagorda finally got a motorboat in 1907 after he wrote a letter explaining that he had to sail his twenty-one-foot boat twenty-five miles to get provisions. The natural process that eroded the Gulf Coast barrier islands at one end while building them up on the other end often complicated the siting of lights.

Despite Baker's impressive scholarship, however, I found myself frustrated in several ways by his presentation. Only when I finally consulted a map did the history of Texas lights become coherent. Geography is the bedrock of commercial development, and in Texas, impediments created by extensive barrier islands, the silting of river mouths, and the destruction wrought by periodic hurricanes hurtling across the Gulf are intrinsic to this story. While Baker of course includes these elements in his profiles of individual lights, he leaves it to his readers to construct the panorama. Only a map, for instance, can fully show the reason for the early rivalry between Galveston and Matagorda Bay to the south. In 1847, Congress appropriated $15,000 for major lights at each site, but hurricanes later destroyed Matagorda's port, Indianola, once considered "second only to Galveston." Later development of deep water ports at Texas City and Houston, upstream from Galveston, further assured its preeminence, and that of its Bolivar Point lighthouse.

A map would have clarified the order of Baker's presentation as well. My struggle to understand the sequence chronologically in the end proved futile — the lights are listed from south to north. A map keyed to the text could also have lessened the mystery surrounding those lights no longer standing, which are not discussed in the text. Location of their sites and the dates of their establishment and darkening would have shown their position in the overall development of Texas lighthouses

and rounded out this otherwise thorough documentation. It is unlikely that we will be able to learn about them in a future *Lost Lighthouses of Texas.*

My other reservations about *Lighthouses of Texas* are relatively minor. Baker applies the term "Lighthouse Service" to the administration of United States lighthouses from their earliest days, but it was only after establishment of the Lighthouse Board in 1852 that a separate entity was made responsible for the country's navigational aids. Previously, lighthouses had been entrusted to an ever-shifting array of bureaucrats within the Treasury Department, leaving *de facto* control in the hands of whale oil dealers and other contractors, causing United States navigational aids to lag decades behind those of Europe. Only after creation of the Lighthouse Board could a lighthouse service be said to exist. Furthermore, typographical errors in at least three instances made dates incorrect by one hundred years.

Baker's histories do, however, provide a wealth of information about each of the lights described and will be especially useful to tourists — the audience, after all, for whom Baker wrote *Lighthouses of Texas.*

SARAH C. GLEASON

Providence, RI

DAVID MILLER, *Submarines of the World: A Complete Illustrated History 1888 to the Present* (New York: Orion Books, 1991). 189 pages, illustrations, index. $30.00.

Anthologies or "complete illustrated histories" are not everyone's cup of tea. To the purist they are never "complete," and this book is no exception. To those with a more casual interest or those desiring a literary style, they are either too detailed or lack real substance. Miller's book is better than most in this regard, and I liked it. It contains a very real wealth of detail on his selected classes of boats (submarines are, for no obvious reason, called boats rather than ships, within "the Trade"), magnificent colored drawings, unusual photos, and many useful tables. In fact, the only real quarrel one could have, for an anthology, is the use of the term "complete," for it is certainly not that. The first fifteen pages of the Introduction cover in general terms the development of submarines in America, Britain, Germany, France, Italy, and the like. The author includes brief notes on their construction, the motor torpedo, missiles, minelaying abilities, accidents, command and control, and tactical use in the two World Wars and the Cold War — a tall order, considering that there are also thirty-five drawings and photos and two tables within those pages! But it is a good, albeit sketchy, review of "why submarines?"

Then the author divides his text and illustrations by country, discussing first the major submarine builders: the United States, the USSR, Germany, Britain, Japan, France, and Italy. He covers each of these in eight to twenty pages, with a general introduction to each country's adoption and war use of submarines, often with tables of building programs and losses. Then follows one or two pages of carefully prepared details on selected classes of boats over the years. But many whole classes of boats receive only passing reference, such as the U.S. Navy's important and numerous *Balao* class, and the Royal Navy's immediate postwar A class. Miller provides good, detailed coverage of those classes he selects, including design, equipment, and operational histories of the class. The rest of the world's navies then receive two or three pages of coverage each, with at least brief remarks on the histories of their development or sometimes very temporary employment of submarines. but the author does not discuss all of them; he omits Portugal, Yugoslavia, and Canada, for example, all of whom owned and operated submarines at one time, although they were either copied or even bought from larger nations. Most of the third world submarine operators bought theirs, however, so why discuss some countries, if not all?

All this said, this is indeed a beautiful book. In particular, the John Batchelor perspective art work illustrates his subjects more clearly than any photo could. It is a book for browsing, for sipping at, for looking up a particular class detail, or for seeing from whence a country's requirement for these fascinating vehicles of war was derived. The tables given for the major operators are useful, and although they appear in other books, they are possibly not so easily found as here. Minor fascinating details abound, such as the Japanese army building its own twenty-six transport submarines and declining the navy's help in their design and construction, or Argentina's confusing tendency to name boat after boat *Santa Fe.* This is a book for the aficionado, or for those with a real interest in submarines over the years, or for the neophyte wishing to gain a good broad general perspective of that genre. And it leads one to ask some general questions: can non-nuclear powered boats, for example, continue to be without any anti-air defenses? The latest Argentinean *Santa Fe* was destroyed by helicopters! Or how do countries that largely ignore the mining threat intend to cope with the realities of easy submarine minelaying at chokepoints off harbors? Overall, *Submarines of the World* is an interesting, entertaining, and useful volume.

FRASER M. MCKEE

Markdale, Ontario

DANA A. STORY, *Growing Up in a Shipyard: Reminiscences of a Shipbuilding Life in Essex, Massachusetts* (Mystic, CT: Mystic Seaport Museum, Inc., 1991). 133 pages, illustrations.

This is a straightforward book that delivers what its title promises. By "growing up," Dana Story means both growing from childhood to manhood and growing in maturity, wisdom, and experience while building wooden ships. His reminiscences are based in his family's shipyard, two acres of historic ground on the Essex River in Essex, Massachusetts. His father, Arthur D. Story, built 424 vessels there in the years 1872-1932. Among them was the exquisite schooner *Gertrude L. Thebaud*. Dana Story built seven wooden draggers there.

As a member of the fifth generation of his family to build wooden ships in Essex, Story was born to his task. His book is not an autobiography, but is autobiographical and not self-serving. His purpose is to tell how it was to build wooden ships in Essex. As the last man to do so, he has shared firsthand knowledge with his readers that otherwise could be lost. Unfortunately, both his and his father's records were burned in a fire more than forty years ago. As a result, the book is based on Story's extensive collection of photographs, his memory, and the recollections of some who worked with him. In this memoir, Story makes it clear that he failed as a businessman, and he explains why he failed.

The men who influenced Story's education were almost all Yankees, hard-working experts at their crafts who dealt with the vicissitudes of unemployment when the yards were empty. They are an integral part of these reminiscences. One was John Prince Story (no relation), who hired the author so he could learn more of the business before repurchasing the family yard and starting his own shipbuilding company. Another Essex man, Tom Bost, was his mentor. "Daney" Story, as he was called, also recounts learning of the "vast differences between an educated man and a wise man."

Story shares the common experiences of growing up in Essex: the custom of "going around in her," inviting anyone in the town to ride a newly launched vessel down the Essex River to Gloucester for fitting out; going to summer camp at Lake Ossipee, New Hampshire; visiting Washington, D. C. with his high school class, and discovering that Long Island Sound steamers were "the ultimate in civilized conveyances."

The author also shares his deeply humiliating experience of flunking out of the Massachusetts Institute of Technology, and describes going to work in the Hull Department of Sun Shipbuilding and Dry Dock Company in Chester, Pennsylvania. "Daney" was razzed at "Sun Ship" for his Yankee accent and for being 4-F, hence unable to serve in World War II. He also speaks of his marriage and family and how he became a shipbuilder "by osmosis." The author "owns up" to pulling a dumb stunt in a real estate transaction and tells his readers of the mental stress associated with creating a financial failure, after which, like a stout Yankee, he took to pick-and-shovel work to feed his family. And, like many New Englanders, he served in the town's volunteer fire department, an obligation and experience hard to convey to today's urban dwellers.

What may be the most important part of Story's life, at least to others who love the sea, ships, and their traditions, occurred after his last wooden vessel was towed down the river. He ordered his vast collection of photographs and wrote four other finely illustrated books showing and telling how it was done. He was also a prime mover in the establishment of the Essex Shipbuilding Museum which preserves the tradition of his town's past.

The acceptance of being at once unsuccessful in business and the bearer of a great tradition is summed up by Story: "As the tide flows in, reaches its full, and then ebbs away, so also did my hopes, my spirits, my ambitions rise, reach a peak, and quietly ebb away. At least it all made quite a splash while it was happening." Dana Story has done important things in his life: he learned the measures of men, came to know how to build wooden vessels, preserved and recorded that knowledge, and shared it with others. It all makes good reading.

LAWRENCE ALLIN

Norman, Oklahoma

J. C. ARNELL, ED., *Bermuda Journal of Archaeology and Maritime History* (Bermuda: The Island Press, 1989). 6" x 9", paperback, illustrations, charts, plans, and diagrams. $20.00 annually.

This paperback journal well deserves review in *The American Neptune* because it fills a serious gap in Bermuda's printed history; a gap caused when its predecessor publication, *The Bermuda Historical Quarterly*, ceased publication several years ago.

The new history journal of Bermuda is published by the Bermuda Maritime Museum, which is "dedicated to the protection, collection, conservation, restoration, and safe-keeping of documents, photographs, paintings, and artifacts with significance to Bermuda's maritime history." The historical association operates a museum in the Keep Yard of the former Royal Naval Dockyard on Ireland Island in Bermuda. The museum was founded in 1974.

When *The Bermuda Historical Quarterly* stopped publication, the museum looked into the possibility of starting a successor journal. In November of 1989, Edward Harris, director of the Bermuda Museum, was able to notify the late Archibald R. Lewis, then editor of *The American Neptune*, that the new journal was ready and a copy was enclosed. Harris also extended his thanks to Mr. Lewis for advice given by the *Neptune*'s editor about the need for a good backlog of articles and sufficient funding to get such a journal off the launching pad. Harris points out that the new journal was produced in the museum using a Macintosh computer "so that all the printer saw was a final layout ready for printing." Sounds like a description of how some weekly newspapers are being produced today.

Harris thinks that the new *Bermuda Journal* is "a reasonable successor to the *Historical Quarterly* which went defunct almost a decade ago." With this, no one will disagree. The new journal is a fine piece of work and there is every indication that there will be no dearth of good material to keep the publication going.

Bermuda has a sea history older than the United States. The Spaniards tried to make use of Bermuda when their ships headed for Spain from the Caribbean. In the lead article of the *Bermuda Journal*, David B. Quinn of the School of History of Liverpool University wrote about Bermuda in the Age of Exploration and early settlement. Quinn pointed out that it was the Spanish and possibly the French who used Bermuda in those early years. The island is shown on the Peter Martyr map of 1511. But, says Quinn, "It was not until the English sent out the *Plough* in 1612, following the wreck of the *Sea Venture* in 1609, that a permanent settlement was established."

One interesting aspect of the new journal is the use of segments of the early minutes of the Governor's Council. These minutes in many ways took the place of a newspaper on the island until the latter part of the eighteenth century, according to editor J.C. Arnell. Arnell says that the late *Historical Quarterly* published sections of these minutes in every issue of its thirty-nine year existence, and the new *Bermuda Journal* picks up where the *Quarterly* left off.

Considering the pains and problems of any new publication, the *Bermuda Journal of Archaeology and Maritime History* would appear to be off to a rousing start.

JOHN R. HERBERT

Spring Hill, Florida

To our readers:

In Thomas Wildenberg's article on "The Origins and Development of the T2 Tanker," which appeared in the Summer 1992 issue of the *Neptune*, the caption under the body plan of the *Cimarron* (page 164) incorrectly assigns that vessel the designation "T3-SE-A1." The author has pointed out to us that this designation would mean that the vessel was turbo-electrically powered, which she was not. The correct designation for *Cimarron* is "T3-S2-A1," the "S2" indicating that she had twin screws.

In the Fall 1992 issue of the *Neptune*, Merritt Edson's letter to the editor states that the frigate *Congress* "carried forty guns from 1799 until she was broken up at Norfolk in 1838" (page 265). The latter date should in fact be 1836. The *Neptune* regrets these errors.

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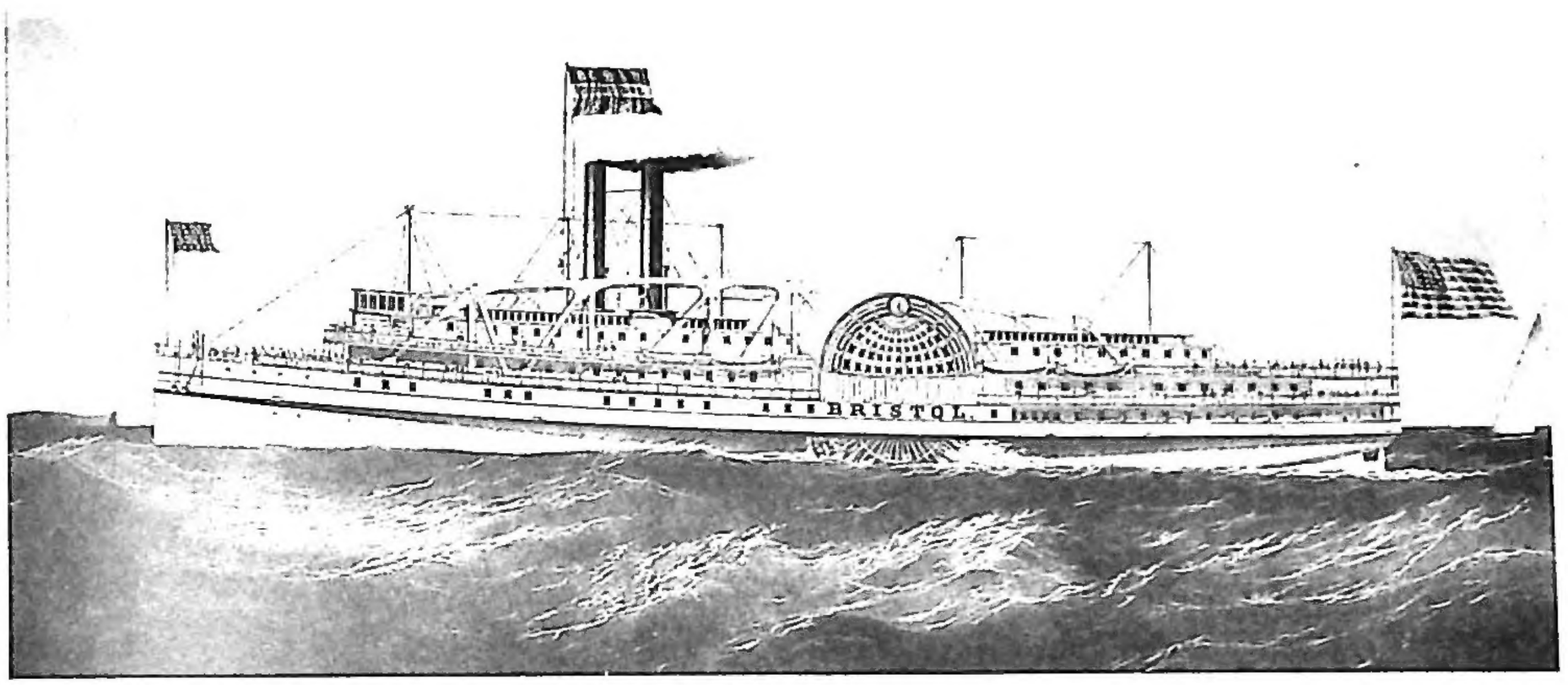
DONALD S. MARSHALL, *Director of Publications*



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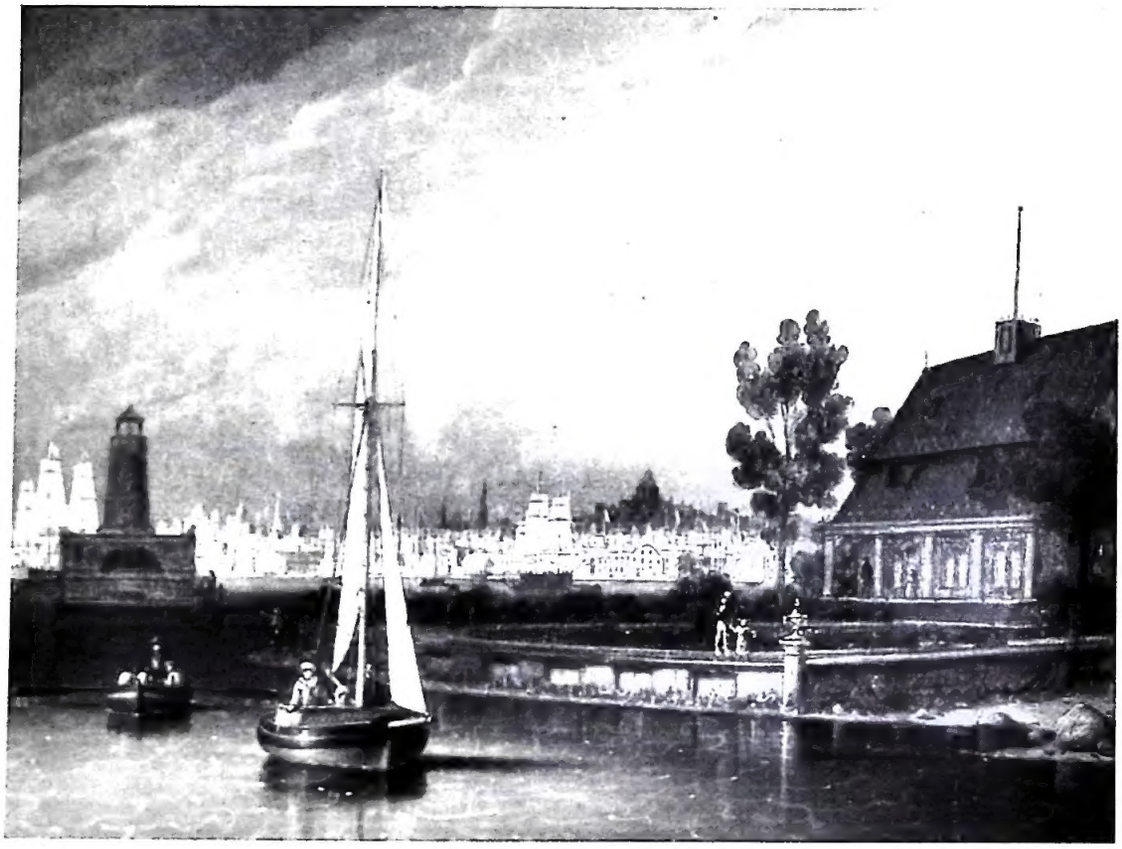

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